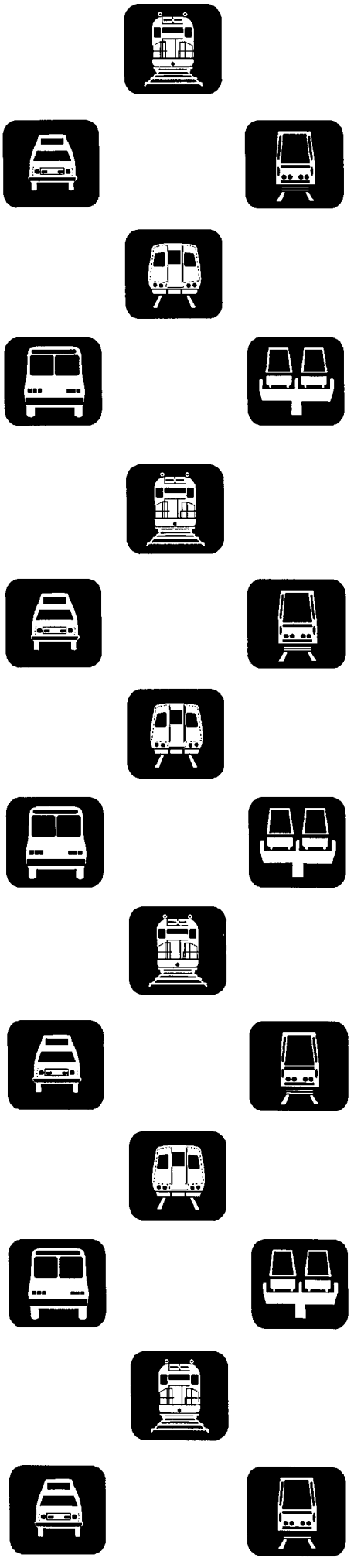
Federal **Transit Administration**

NATIONAL TRANSIT SUMMARIES AND TRENDS

For the 1994 National Transit Database Report Year



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List of Exhibits

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Service Supplied and Consumed

- Over 7.7 biion unlinked trips used some mode of transit service in 1994, amassing 37.9 billion passenger miles. There were almost 2.7 billion miles of vehicle revenue service provided, with over 73,600 transit vehicles operating daily in maximum service.

Safety, Reliability, and Maintenance Effectiveness

- The national rate of transit injuries is 793 injuries per 100 million unlinked passenger trips for all modes combined. Transit service reliability as measured by the number of vehicle revenue miles per roadcall decreased from 1993 by 7 percent for bus.

National Transit Profile
1994

General Information (System Wide)

Service Consumption (millions)

Annual Passenger Miles	**37,881.5**
Annual Unlinked Trips	**7,701.6**
Average Weekday Unlinked Trips	25.6
Average Saturday Unlinked Trips	13.3
Average Sunday Unlinked Trips	8.4

service supplied

Annual Vehicle Revenue Miles (millions)	**2,679.5**
Annual Vehicle Revenue Hours (millions)	180.3
Total Fleet	92,436
Vehicles Operated in Maximum Service	73,648
Base Period Requirement	32,279

vehicles **Operated** in Maximum service

Directly Operated	**Vehicles**	**Agencies** *
Bus	40,543	339
Heavy Rail	8,277	14
Commuter Rail	3,828	9
Light Rail	769	19
Demand **Response**	2,976	185
Other	**1,742**	**39**
Total	**58,135**	**605**

Purchased Transportation	**Vehicles**	**Agencies** *
Bus		
Heavy Rail	3, **0**	122 0
Commuter Rail	**521**	10
Light Rail	0	**0**
Demand Response	9,852	**257**
Other	1,960	**20**
Total	**15,513**	**409**

Financial Information (System Wide)

Sources of Operating **Funds Expended (millions)**

Passenger Fares	**$6,466.4**
Local Funds	**5,815.4**
State Funds	**3,626.7**
Federal Assistance	861.5
Other Funds	**574.7**
Total Operating Funds Expended	**17,344.7**

Summary **of Operating Expenses (millions)**

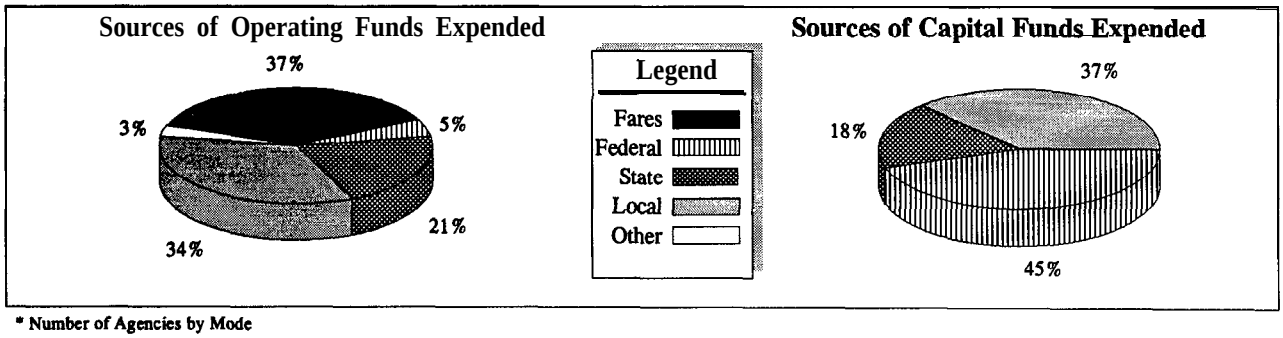
Salaries/Wages/Benefits	**$12,216.3**
Materials **&** Supplies	1512.2
Purchased Tmnsportation	988.4
Other Expenses	**1,602.9**
Total Operating Expenses	, .
Reconciling Cash Expenditures (millions)	$961.4

Sources of Capital Funds Expended (millions)

Local Funds	**$2,074.8**
State Funds	**1,005.5**
Federal Assistance	**2,518.1**
Total Capital Funds Expended	**$5,598.4**

Uses of Capital Funds (millions)

	Rolling Stock	**Facilities aud Other**		**Total**
Bus Heavy Rail	$611.9 212.6	**1,857.4**	8736.1	$12,070.1
Commuter Rail	226.6	**1,159.8**		**1,386.4**
Light Rail	56.4	465.8		522.3
Demand Response	43.3	18.6		61.9
Other	100.5	109.1		**209.5**
Total	**$1,251.3**	**$4,346.9**		**$5,598.2**



* Number of Agencies by Mode

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Chapter 3: Key Characteristics by Urbanized Areas

This chapter offers insight into the characteristics of transit services based on UZA siie. Data are presented for UZAs under 200,000 population, for UZAs that have populations between 200,000 and 1 million, and for UZAs of over 1 million population.

Chapter 4: Capital Funding

This chapter discusses sources of capital funding and its uses (rolling stock, facilities, and other uses) by mode and size of UZA.

Chapter 5: Operating Funding and Expenses

Sources of operating funding, as well as the cost of operating service, are discussed in this chapter. A reporting change was introduced in 1994 which required agencies to report only the operating funds that were expended in the report year. Operating funds received during the report year that did not result in an expense in that year were not reported. Operating expenses are allocated by mode, by function (vehicle operations, vehicle maintenance, non-vehicle maintenance, and general administration), and by object class. Object classes are groupings of expenses on the basis of goods or services purchased. Object classes include salaries and wages, fringe benefits, services, material and supplies, purchased transportation, and other expenses.

Chapter 6: Service Supplied and Consumed

This chapter provides an analysis of service effectiveness and discusses both the amounts and kinds of transit services provided and utilized. Performance measures are used to evaluate the effectiveness of transit service by reflecting ridership and operating costs by various measures of service supplied.

Chapter 7: Safety

This chapter discusses measures of data designed to offer insight into safety-related issues regarding transit.

Chapter 8: Reliability and Maintenance Effectiveness

This chapter presents measures of reliability of service and effectiveness of vehicle maintenance. Data about maintenance expense and service interruptions are also included.

Inflation

All revenue and cost information are represented in dollars as actually reported. Data have not been adjusted to reflect the impact of inflation. The consumer price index (urban) increased 16.5 percent between 1990 and 1994. The increase from December 1993 to December 1994 was 2.8 percent.

Rounding

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burden and to develop more consolidated reporting. The number of demand response reporters has increased steadily each year. There are 20.5 percent more demand response reporters in 1994 than in 1990.

The number of reports indicating purchased transportation of transit service has also increased. As shown in **Exhibit 1,** this increase is most noticeable in the number of bus and demand response reporters. The number of reports reflecting purchased bus service has increased by 2 1.3 percent since 1990, while the number of reports incorporating purchased demand response service has increased by 22.3 percent since 1990. The bus increase is related to a change in reporting thresholds as one means of reducing the reporting burden.

Type of Service

The data in the NTD are organized by mode and type of service. There are two types of service: purchased transportation service and directly operated service.

A transportation service is considered purchased transportation in the NTD when a contractual relationship exists between at least two entities. The contractual relationship is for the provision of public transportation service and includes payments or accruals to sellers, fare revenues retained by the seller, and other expenses incurred by the buyer (purchaser) for items such as contract administration, services, and materials (advertising, customer information services, fuel maintenance, etc.). Generally, the entity buying the service is a public agency and the seller is a private organization.

The other type of service in the NTD is directly operated service. The service provided by a transit agency is considered directly operated when the transit agency is the entity responsible for generating the service to the public. Directly operated service can be provided by either a public or private entity. In the NTD, a typical transit agency has both directly operated service and purchased transportation.

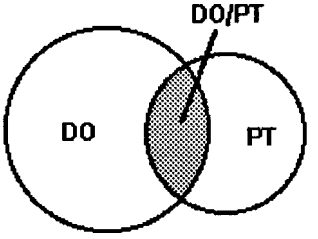
Reporting Purchased Transportation Data

There are two different ways of reporting purchased transportation data in the NTD. The most common way is the buyer reporting to the NTD and including the data related to its purchased transportation service in its report. In most cases, the buyer has a directly operated service in addition to the purchased transportation service; however, some reporters have exclusively purchased transportation and report on behalf of their sellers. The reporting requirements for purchased transportation included in the buyer's report are a subset of the data available in the NTD. This subset includes total operating expenses for the buyer (the lump expense without allocation by function or object class); transit way mileage which includes data related to fixed guideway directional route miles; and other infrastructure data by mode, service supplied, service consumption, and vehicle inventory. The operating expense incurred by the buyer is allocated under object class "purchased transportation in report" and is coded as 508.01. The cost for the seller is unknown when purchased transportation is reported under object class 508.01. In addition, all financial and operational data are aggregated for all purchased transportation providers under contract.

The second way of reporting purchased transportation is the seller filing its NTD report. In this case, the purchased transportation data are reported from a directly operated perspective and the reporter is required to provide additional data that are used in the full database dependiig on the size of the agency reporting. NTD requires all private carriers operating more than 100 vehicles in maximum service to file a separate NTD report. However, some private carriers operating less than 100 vehicles in maximum service also submit NTD reports, These are, in most cases, private providers reporting on behalf of their buyers which are not NTD reporters. When the seller files a separate report, the buyer reports only the total operating expense incurred for the service provided. This expense, which is the cost for the buyer, is allocated under object class "purchased transportation tiling a separate report" and is coded as 508.02 in the buyer's report. The seller, however, provides a full separate report and its expenses are fully allocated by function and object class. The total operating expense in the seller's report is the cost to the seller.

Because of their definition, directly operated and purchased transportation categories are not mutually exclusive categories of service; therefore, a full account of any data item for both categories cannot be totaled without resulting in a double counting of the data. In addition, any aggregation of purchased transportation data is limited to the data subset required from reporters that included purchased transportation in their reports. In Exhibit 2, directly operated (DO) and purchased transportation (PT) are represented by two different circles. The DO circle is bigger than the PT circle, because directly operated is a more common category of service than purchased transportation. The intersection of the two circles (shaded area) represents all private providers reporting their directly operated services and is, therefore, privately generated transit data.

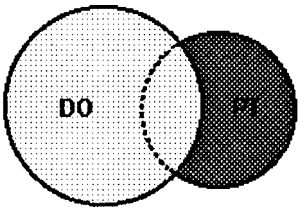
Directly Operated and Purchased Transportation Data **Exhibit 2**



The portion of the DO circle that does not overlap the PT circle represents data for services provided by public agencies directly operating their services (no purchased transportation). These data can be generally considered as publicly generated transit data. The portion of the PT circle that does not overlap the DO circle is purchased transportation data reported by public agencies included in the DO circle and is privately generated transit data reported by the buyer (public agency).

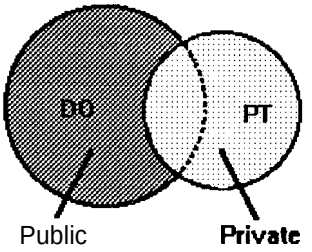
In many exhibits of the *NTST*, the aggregation of data is split between directly operated and purchased transportation in the report (object class 508.01). A full account of directly operated service is provided. However, the purchased transportation data are partial and do not include private providers filing their own reports, since private providers report fiom a directly operated perspective. Schematically, the exhibits by type of service (directly operated and purchased transportation) are split in the way shown in Exhibit 3.

Exhibit 3 ***Splitting Data Between Directly Operated and Purchased Transportation***



In some instances, it might be more interesting to split the data by private and public providers. Schematically, a split between the public and private data is shown **in Exhibit** 4.

Exhibit 4 ***Splitting Data Between Public and Private Providers***



The intersection of the two circles represents the purchased transportation directly operated. These data are included in **Exhibit** 5. For a given exhibit where the data are split by type of service (directly operated and purchased transportation), the sum of the data item displayed **in Exhibit** 5 with the purchased transportation data item included in the exhibit under analysis will result in the total purchased transportation data item. Similarly, the data included **in Exhibit** 5 subtracted **from** the total directly operated data item will result in the total data item generated by public agencies.

Exhibit 5 ***Key Statistical Indicators for Purchased Transportation Agencies That Report as Directly Operated 1994***

Mode	Number of Modes Reported	Operating Expense (000s)	Unlinked Passenger Trips (000s)	Passenger Miles (000s)	Vehicle Revenue Hours (000s)	Vehicle Revenue Miles (000s)	Vehicles Operated in Maximum Service
Bus	2 2	$451,544.8	233.400.7	1.512.519.5	6,371 .O	92.711.2	2,641
Commuter Rail	2	125.383.0	35,124.0	758,329.4	494.1	16.474.0	480
Demand Response	10	26.516.5	2.623.1	22.955.5	1,091 .0	12.855.4	443
Total	34	$603,444.3	271 147.8	2,293,804.4	x966.1	122,040.6	3,564
% Directly Operated		4.1%	3.6%	6.496	6.2%	5.3%	6.1%

Purchased transportation, **from** a directly operated perspective, **affects** only three modes in the NTD: bus, demand response, and commuter rail. All other modes which have purchased transportation have their data consolidated in the buyer's report. As displayed in **Exhibit** 5, there are 34 modes reported by 30 agencies reporting purchased transportation from a directly operated perspective. The percent of directly operated service is also included.

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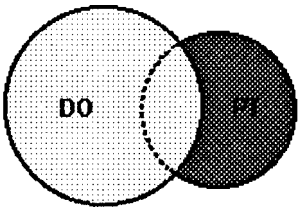

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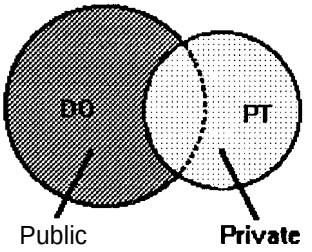

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Performance Indicators

The *NTST* presents several performance measures as indicators of efficiency and effectiveness. These indicators include operating expense per vehicle revenue hour, operating expense per vehicle revenue mile, unlinked passenger trips per vehicle revenue hour, unlinked passenger trips per vehicle revenue mile, operating expense per unlinked passenger trip, and operatiig expense per passenger mile. Most of these measures are presented by mode and type of service.

Relative Impacts of the Data

The data in the NTD are highly concentrated in large UZAs as seen in **Exhibit 6.** This concentration is not surprising, given the nature of public transit, especially mass transit, which provides public transportation services in densely populated areas. In terms of service consumed, over 88 percent of all data are reported by agencies in UZAs with over 1 million population. In addition, 88.1 percent of operating expenses and 92.5 percent of capital funds expended were reported by agencies in these large population centers.

Exhibit 6

Relative Impacts of the Data (Percentage) by UZA Size
1994

	Under 200,000	200,000 to 1 Million	Over 1 Million
Service Consumed			
Passenger Miles	2.5	7.3	90.1
Unlinked Trips	3.1	*8.9*	88.0
Service Supplied			
Vehicle Revenue Miles	**6.9**	14.0	79.1
Vehicle Revenue Hours	7.4	14.7	77.9
Vehicles Oper. Max. Service	8.7	15.4	75.9
Operating Funds Total	3.2	8.7	88.1
Passenger Fares	1.9	5.1	93.0
Operating Expenses Total	3.3	8.5	88.1
Capital Funds Total	2.1	5.4	92.5
Uses of Capital Funds			
Rolling Stock	**5.9**	10.6	83.5
Facilities and Other	**1.0**	4.1	94.9

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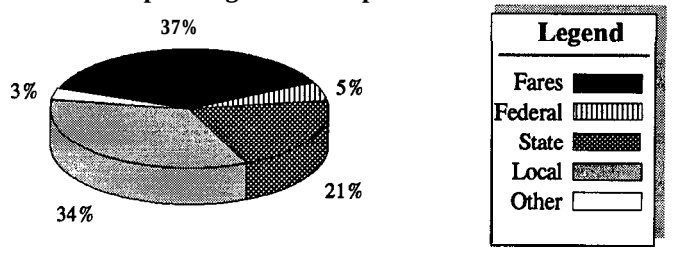

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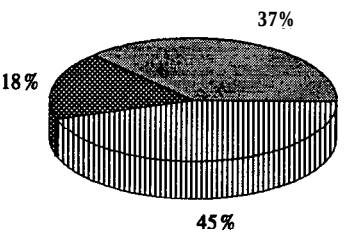

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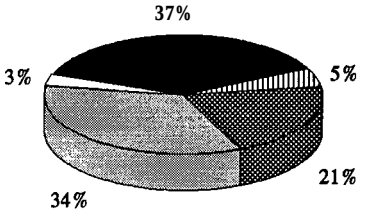
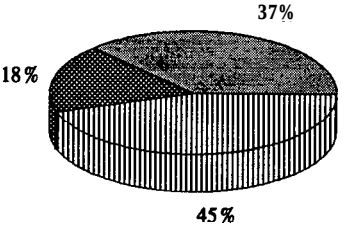
Demand Response	43.3	18.6	61.9
Other	100.5	109.1	209.5
Total	**$1,251.3**	**$4,346.9**	**$5,598.2**

Sources of Operating Funds Expended



Sources of Capital Funds Expended

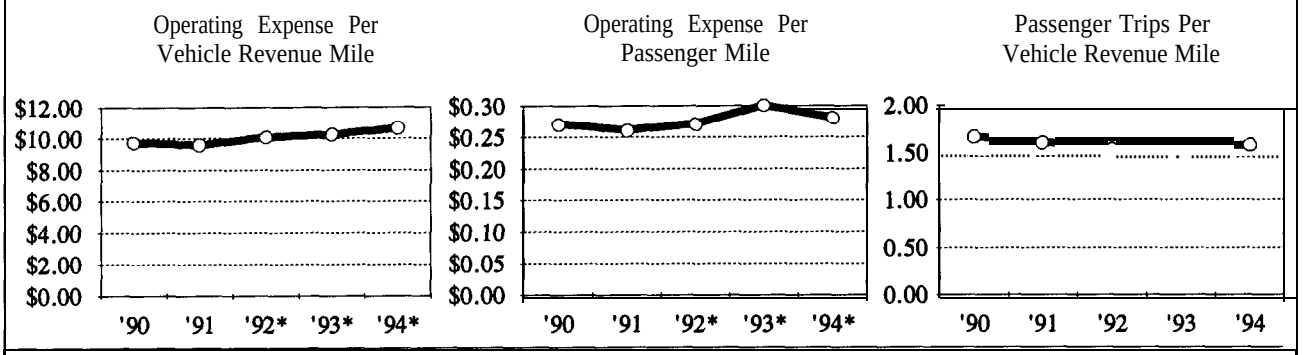


*** Number of Agencies by Mode**

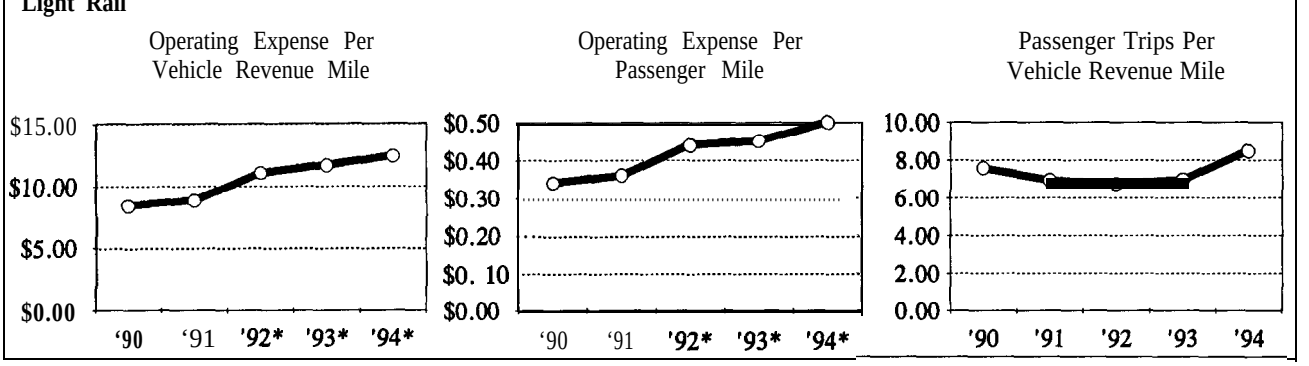
Exhibit 7 (continued) **National Transit Profile by Mode**

Characteristics	Commuter Rail	Light Rail
Operating Expense (millions)	$2,227.8	$411.6
Capital Funding (millions)	$1,386.4	$522.3
Annual Passenger Miles (millions)	7,995.9	831.0
Annual Vehicle Revenue Miles (millions)	209.5	33.3
Annual Unlinked Trips (millions)	339.0	282.2
Average Weekday Unlinked Trips (millions)	1.2	0.9
Annual Vehicle Revenue Hours (millions)	6.2	2.3
Fixed Guideway Directional Route Miles	6,033.4	561.9
Total Fleet	5,126	1,031
Average Fleet Age in Years	19.2	14.3
Vehicles Operated in Maximum Service	4,349	769
Peak to Base Ratio	2.0	1.6
Percent Spares	18%	34%
Performance Measures		
Service Efficiency		
Operating Expense/Vehicle Revenue Mile	$10.63	$12.38
Operating Expense/Vehicle Revenue Hour	$359.37	$178.13
Cost Effectiveness		
Operating Expense/Passenger Mile	$0.28	$0.50
Operating Expense/Unlinked Passenger Trip	$6.57	$1.46
Service Effectiveness		
Unlinked Passenger Trips/Vehicle Revenue Mile	1.62	8.48
Unlinked Passenger Trips/Vehicle Revenue Hour	54.68	122.13

Commuter Rail



Light Rail



*** Joint expenses eliminated and allocated to individual modes.**

Source: 1994 National Transit Database

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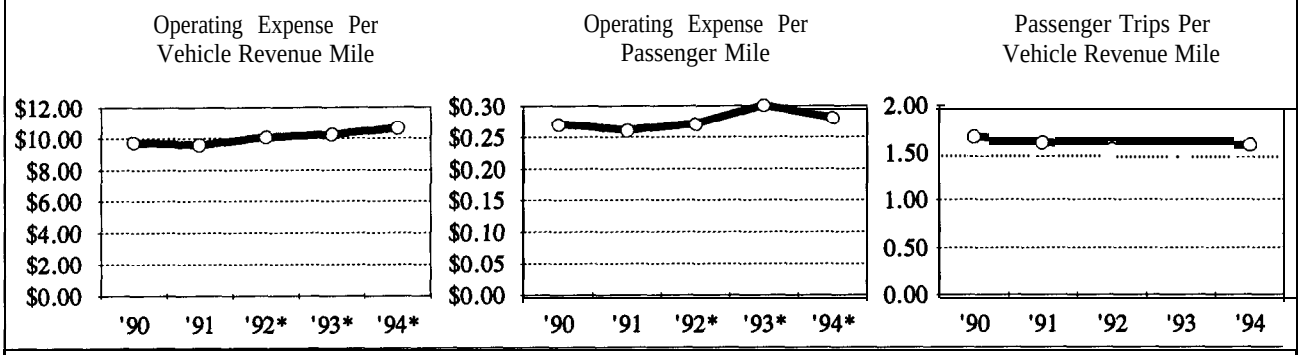
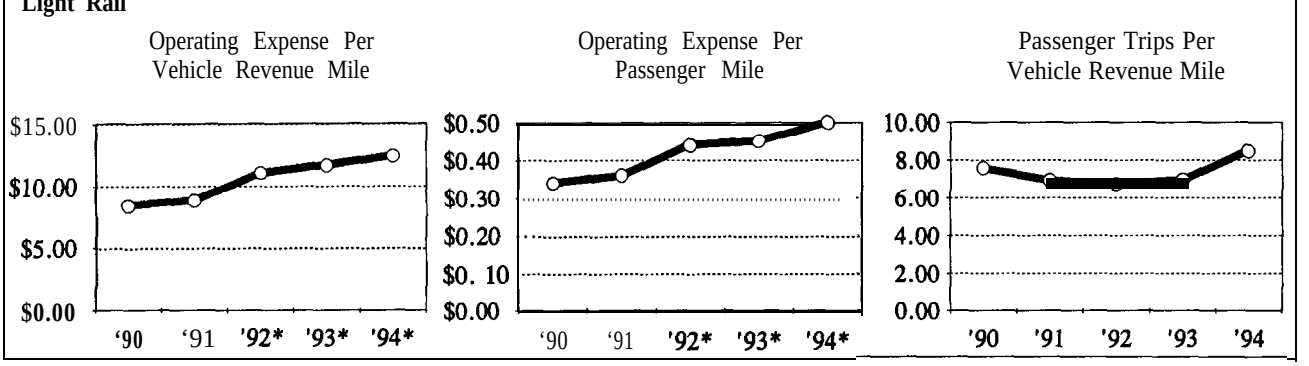
Commuter Rail



Light Rail



*** Joint expenses eliminated and allocated to individual modes.**

Source: 1994 National Transit Database

change by Boston contributed 65 percent of this increase, while the addition of new light rail systems accounted for 30 percent of the total increase. In real terms, 1994 was a stable year for existing light rail systems, but the implementation of new systems in metropolitan areas previously not served by this mode increased the overall potential ridership of light rail.

The revenue mileage for heavy rail and commuter rail increased 2.1 and 3 percent, respectively, from 1993 to 1994. The most significant aspect of heavy rail is that service supplied increased by 2.1 percent despite the "loss" of some high revenue mileage lines to light rail. Demand response was the mode with the second highest increase in revenue miles, with an increase of 12.1 percent in 1994. From 1985 to 1994, the increase in revenue miles for demand response was 302 percent. This increase is explained by a growing demand for this mode.

In the aggregate, transit service consumed, as measured by unlinked passenger trips, decreased during the 19851994 timeframe by nearly 8 percent. However, unlinked passenger trips increased 3.6 percent in 1994, bringing the total ridership back to 199 1 levels. Bus and heavy rail are the only modes with a decline in unlinked passenger trips during the 1985- 1994 timeframe. All other modes of service showed increases in ridership. Annual bus ridership declined by nearly 8 10 million unlinked passenger trips from 1985 to 1994. Bus service in 1994 accounted for nearly 15 percent fewer riders than in 1985; nonetheless, bus service accounted for 60 percent of the unlinked passenger trips made via transit in 1994, compared with 65 percent in 1985. Heavy rail also declined in ridership, carrying nearly 5 percent fewer riders in 1994 than in 1985.

In contrast, such modes as commuter rail, light rail, and demand response carried substantially greater numbers of riders in 1994 than in 1985. These modes show ridership increases of more than 23,216, and over 227 percent, respectively, in 1994 compared with 1985. Again a substantial part of the increase in the ridership for light rail for 1994 is explained by the reporting change by Boston mentioned earlier.

Comparing 1994 with 1993, all modes experienced increases in unlinked passenger trips with the exception of bus, which decreased by 0.2 percent. The ridership for heavy rail increased by approximately 6 percent despite the "loss" of some service to light rail as a result of the reporting change by Boston. Commuter rail displayed an increase of 5.6 percent in ridership for 1994 and light rail displayed a 50.5 percent increase. The contribution of new light rail systems to the increase in ridership for this mode for 1994 was 9.4 percent, and the contribution of the report change by Boston was 86 percent. Demand response experienced an increase in unlinked passenger trips of nearly 4 percent from 1993 to 1994.

Operating Expense

Operating expenses increased consistently in the last 10 years at an average rate of 6.1 percent a year or $634.9 million per year since 1985. The total increase for the 1985- 1994 period is approximately 60 percent, disregarding inflationary effects. In 1994, the nation spent over $16.3 billion on public transit, with an increase of 5.5 percent from 1993 to 1994. This represents a net increase of $847.3 million. In the aggregate, in 1994,

there was a change in the trend for operating expenses, with an increase greater than the average yearly increase of the last 10 years. At the modal level, light rail and demand response were the modes with the highest increase in operating expenses. Operating expenses for light rail increased 3 1 percent compared with 1993, and demand response experienced an increase of 17.4 percent.

Exhibit 8 provides summaries of vehicle revenue miles, unlinked passenger trips, and operating expenses by mode from 1985 to 1994.

Ten Year Data Summary Tables 1985-l 994 **Exhibit 8**

Vehicle Revenue Miles by Mode (Millions)

Year	Mode						Total
	Bus	Heavy Rail	Commuter Rail	Light Rail	Demand Response	Other	
1985	1,463.8	443.2	167.1	15.9	90.4	24.7	2,205.I
1986	1,476.1	462.6	170.2	16.7	104.8	24.9	2,255.3
1987	1,497.2	473.9	169.9	16.0	113.4	25.6	2,298.0
1988	1,508.5	503.0	183.5	20.1	132.8	27.1	2,375.0
1989	1,506.4	513.1	190.2	20.5	152.1	23.1	2,405.4
1990	1,534.5	520.6	193.1	23.0	171.2	24.3	2,466.9
1991	1,552.3	506.3	197.9	26.6	185.8	27.6	2,493.f
1992	1,555.9	509.7	199.9	27.8	208.5	32.2	2,534.0
1993	1,578.3	505.2	203.4	26.9	243.4	36.0	2,593.2
1994	1,585.8	516.0	209.5	33.3	272.8	62.1	2,679.5

Unlinked Passenger Trips by Mode (Millions)

Year	Mode						Total
	Bus	Heavy Rail	Commuter Rail	Light Rail	Demand Response	Other	
1985	5,438.7	2,289.8	275.3	130.7	23.8	191.4	8,349-f
1986	4,959.8	2,332.7	305.8	128.4	27.3	176.3	7,930.3
1987	4,795.7	2,402.1	310.9	131.3	29.2	196.6	7,865.8
1988	4.794.0	2,307.7	324.9	152.6	34.1	199.2	7,812.5
1989	4,838.1	2,541.9	329.6	161.1	36.7	190.6	8,098.0
1990	4,887.1	2,346.3	328.4	174.0	39.7	190.1	7,965.6
1991	4,825.5	2,167.0	323.8	183.6	42.4	192.6	7,734.9
1992	4,748.0	2,207.2	313.6	187.4	45.3	194.2	7,695.7
1993	4,638.5	2,045.6	320.8	187.5	52.0	188.3	7,432.7
1994	4,629.4	2,169.4	339.0	282.2	54.1	227.7	7,701.8

Operating Expense by Mode (Millions)

Year	Mode						Total
	Bus	Heavy Rail	Commuter Rail	Light Rail	Demand Response	Other	
1985	$6,017.2	$2,847.5	$731.7	$140.1	$154.4	$306.1	$10,197.0
1986	6,336.0	3.101.6	1,640.3	158.2	176.2	309.0	$11,721.3
1987	6,737.0	3.234.7	1,748.4	171.6	211.2	254.0	$12,356.9
1988	6,994.8	3,524.0	1,889.2	197.2	251.6	261.3	$13,118.1
1989	7,295.0	3,703.5	2,068.1	209.4	322.5	284.1	$13,882.6
1990	7,778.6	3.825.0	2,156.8	236.0	385.5	322.8	$14,704.7
1991	8,329.6	3,841.2	2,175.4	289.7	442.6	325.2	$15,403.7
1992	8,625.1	3,555.1	2.169.7	307.2	499.8	341.6	$15,498.5
1993	8,514.0	3,669.0	2,080.0	314.0	540.0	355.7	$15,472.7
1994	8,859.5	3,786.2	2,227.8	411.6	633.9	400.9	$16.319.9

there was a change in the trend for operating expenses, with an increase greater than the average yearly increase of the last 10 years. At the modal level, light rail and demand response were the modes with the highest increase in operating expenses. Operating expenses for light rail increased 3 1 percent compared with 1993, and demand response experienced an increase of 17.4 percent.

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Upon examination of service efficiency as measured by the ratio between operating expenses and vehicle revenue miles during the 1985-l 994 timeframe, the overall increase was 32 percent and the expansion in service supplied was 22 percent. The modes with the greatest increases during the 1985-1994 period are commuter rail, light rail, and demand response, with increases of 242, 40, and 136 percent, respectively. Commuter rail had sharp increases in operating expense per vehicle revenue mile from 1985 to 1990 and decreased from 1990 to 1993. The increases for light rail and demand response are explained mainly by a sharp increase in the number of new systems which began operation during the 1985-1994 timeframe.

One measure of service effectiveness is the ratio of unlinked passenger trips by vehicle revenue mile. **Exhibit 10** displays these data for the 1985-1994 timeframe. In the aggregate, the ratio for 1994 is identical to 1993. However, upon examination of each mode, only bus and demand response displayed decreases in service effectiveness in 1994. The ratio for rail modes increased in 1994, with light rail increasing nearly 22 percent. This increase indicates that in 1994 there was a recovery in the consumption of public transportation and that this recovery was concentrated in the largest urbanized areas (population of over 1 million) of the country where almost all rail modes are located.

Unlinked Passenger Trips Per Vehicle Revenue Mile by Mode 1985-l 994 **Exhibit 10**

Year	Bus	Heavy Rail	Commuter Rail	Light Rail	Demand Response
1985	3.72	5.17	I.65	8.22	0.26
1986	3.36	5.04	I.80	7.69	0.26
1987	3.20	5.07	1.83	7.29	0.26
1988	3.18	4.59	1.77	7.59	0.26
1989	3.21	4.95	I.73	7.86	0.24
1990	3.18	4.51	1.70	7.57	0.23
1991	3.11	4.26	1.64	6.90	0.23
1992	3.05	4.33	1.57	6.74	0.22
1993	2.94	4.05	I.58	6.97	0.21
1994	2.92	4.20	1.62	8.48	0.20

The service effectiveness for bus, as measured by unlinked passenger trips per vehicle revenue mile, remained stable in 1994, with a small decrease of 0.6 percent. This small decrease is explained by a decline in ridership for this mode in small-size and medium-sii urbanized areas. Small-size urbanized areas are those with a population under 200,000 and medium-size urbanized areas are those with a population between 200,000 and 1 million. Light rail displayed the highest increase in service effectiveness in 1994, with an increase of nearly 22 percent compared with 1993. This increase is in part the result of a reporting change by Boston. With this fact taken into account, an increase of nearly 4 percent in the service effectiveness of heavy rail (despite the reporting change by Boston) is the most striking fact in the consumption of public transportation in 1994. Demand response experienced a decrease in service effectiveness in 1994, which has been the

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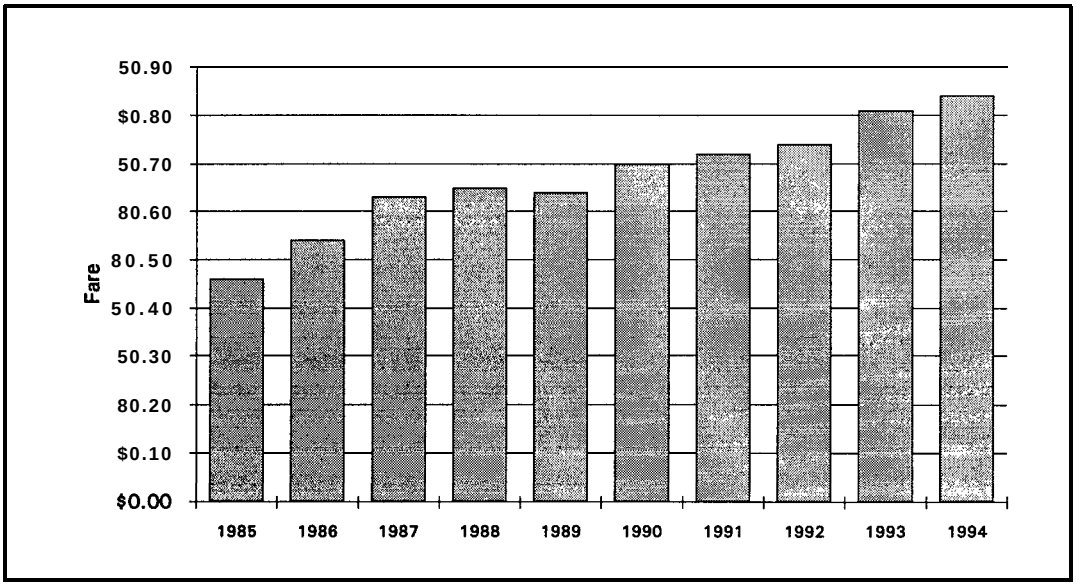
Passenger fare revenue in 1994 was $. 84 per unlinked passenger trip, which represents an increase of 3.7 percent over 1993. During the 1985-1994 period, passenger fare revenue per unlinked passenger trip increased 82.6 percent.

Exhibit 13

Passenger Fare Revenue Per Unlinked Passenger Trip 1985-1994



Chapter 2
Key Modal Characteristics of Transit Agencies

Introduction

The exhibits and discussion in this chapter provide data on operations, performance, and other significant characteristics of the 15 largest bus and demand response transit agencies and for all transit agencies operating heavy rail, commuter rail, light rail, trolleybus, ferryboat, and automated guideway systems. One change introduced this year in this chapter is related to purchased transportation data. In previous years, the exhibits in this chapter displayed data from individual transit agencies which included the directly operated component of the service and the purchased transportation data reported by the individual transit agency. In previous years, agencies that had part of their service supplied by private providers filing their own National Transit Database (NTD) report did not have that component of the service included in the exhibits, because the purpose of this chapter was to provide data for individual reporters. In 1994, all purchased transportation data are included and a full characterization of a transit system's mode is provided.

The change implemented for the 1994 edition of the ***National Transit Summaries and Trends (NTST)*** affects only three modes: bus, demand response, and commuter rail. For bus, New Jersey Transit, New York City Department of Transportation, and Dallas DART are agencies for which the data are an aggregation of their reports and the reports of their providers filing separately. Demand response has private providers filing separately for the following agencies: Port Authority of Allegheny County (Pittsburgh), Metro Dade Transit Agency (Miami), and Pace, Suburban Bus Division (Suburban Chicago). For commuter rail, the private providers, Burlington Northern Railroad and Chicago & Northwestern Railroad, are aggregated with the data provided by the buyer of their services which is the Northeastern Illinois Regional Commuter Railroad Corporation, known as Metra.

Operating expenses for purchased transportation are the expenses incurred by the buyer of the service (object classes 508.1 and 508.2). For more information about purchased transportation, refer to the *NTST* Introduction.

Chapter Organization

Three exhibits are presented for each of the following modes: bus, heavy rail, commuter rail, light rail, and demand response. Information concerning trolleybus, ferryboat, and automated guideway systems is also presented because these modes are the predominant ones in the "other" category. **Exhibits 14 through** 37 provide data concerning service, performance indicators, and infrastructure for each mode.

Chapter 2
Key Modal Characteristics of Transit Agencies

Introduction

The exhibits and discussion in this chapter provide data on operations, performance, and other significant characteristics of the 15 largest bus and demand response transit agencies and for all transit agencies operating heavy rail, commuter rail, light rail, trolleybus, ferryboat, and automated guideway systems. One change introduced this year in this chapter is related to purchased transportation data. In previous years, the exhibits in this chapter displayed data from individual transit agencies which included the directly operated component of the service and the purchased transportation data reported by the individual transit agency. In previous years, agencies that had part of their service supplied by private providers filing their own National Transit Database (NTD) report did not have that component of the service included in the exhibits, because the purpose of this chapter was to provide data for individual reporters. In 1994, all purchased transportation data are included and a full characterization of a transit system's mode is provided.

The change implemented for the *1994* edition of the *National Transit Summaries and Trends (NTST)* affects only three modes: bus, demand response, and commuter rail. For bus, New Jersey Transit, New York City Department of Transportation, and Dallas DART are agencies for which the data are an aggregation of their reports and the reports of their providers tiling separately. Demand response has private providers filing separately for the following agencies: Port Authority of Allegheny County (Pittsburgh), Metro Dade Transit Agency (Miami), and Pace, Suburban Bus Division (Suburban Chicago). For commuter rail, the private providers, Burlington Northern Railroad and Chicago & Northwestern Railroad, are aggregated with the data provided by the buyer of their services which is the Northeastern Illinois Regional Commuter Railroad Corporation, known as Metra.

Operating expenses for purchased transportation are the expenses incurred by the buyer of the service (object classes 508.1 and 508.2). For more information about purchased transportation, refer to the *NTST* Introduction.

Chapter Organization

Three exhibits are presented for each of the following modes: bus, heavy rail, commuter rail, light rail, and demand response. Information concerning trolleybus, ferryboat, and automated guideway systems is also presented because these modes are the predominant ones in the "other" category. **Exhibits 14 through** 37 provide data concerning service, performance indicators, and infrastructure for each mode.

The data indicate that, in addition to the secondary role of private providers for the top 15 bus transit systems, the routes served by the top 15 have a commuter orientation, longer trip lengths, and higher average speeds.

As demonstrated **in Exhibit 15**, 3.79 unlinked passenger trips per vehicle revenue mile are realized on average by the combination of the top 15 bus systems, compared with 2.92 for all bus agencies. However, it should be noted that only 8 of the top 15 agencies demonstrate greater unlinked passenger trips per vehicle revenue mile than the 2.92 average for all bus agencies.

Exhibit 15 also reflects the low service efficiency of these 15 bus agencies. In terms of operating expense per vehicle revenue mile and per vehicle revenue hour, these agencies attained figures of $7.25 and $85.87, respectively, compared with $5.59 per vehicle revenue mile and $72.01 per vehicle revenue hour for all bus agencies. Only 5 of the 15 agencies posted figures that were less than the national average. In terms of operating expense per unlinked passenger trip and operating expense per passenger mile, these 15 agencies averaged $1.9 1 and $0.5 5, respectively. Nationally, the average figures for bus are $1.91 and $0.52. Thus, in terms of cost effectiveness, these 15 agencies are more in line with the national average for bus.

Key Bus Performance Indicators of Transit Agencies
1994

Exhibit 15

ST	Agency Name	Operating Expense				Passenger T s		assenger Miles	Vehicle Revenue Miles
		Per Vehicle Revenue Mile (VRM)	Per Vehicle Revenue Hour (VRH)	Per Unlinked Passenger Trip (UPT)	Per Passenger Mile (PM)	Per Vehicle Revenue Mile (VRM)	Per Vehicle Revenue Hour (VRH)	Per Vehicle Revenue Hour (VRH)	Per Vehicle Revenue Hour (MPH)
CA	LA-LACMTA	$7.63	$92.45	$1.67	$0.45	4.58	55.48	207.34	12.12
CO	Denver-RTD	4.96	80.85	2.11	0.56	2.35	38.27	143.81	16.29
DC	Washington-WMATA	7.87	87.70	2.00	0.64	3.94	43.91	137.13	11.15
IL	Chicago-RTA-CTA	7.11	74.01	1.56	0.66	4.56	47.49	112.61	10.41
MA	Boston-MBTA	8.75	104.78	2.15	0.79	4.08	48.83	132.71	11.98
MD	Baltimore-Maryland-MTA	6.54	76.10	1.54	0.47	4.25	49.46	163.10	11.64
MN	Minneapolis-St. Paul-MCTO	5.33	75.19	2.00	0.50	2.67	37.67	151.08	14.10
NJ	New Jersey Transit	4.85	79.54	2.90	0.36	1.67	27.42	222.00	16.41
NY	NY-MTA-NYCTA	11.67	91.85	1.73	0.90	6.76	53.18	101.75	7.87
NY	New York City DOT	9.85	98.27	1.97	0.53	5.00	49.84	184.15	9.97
PA	Philadelphia-SEPTA	8.31	84.95	1.77	0.61	4.69	47.90	138.31	10.22
PA	Pittsburgh-PAT	5.94	76.85	2.19	0.53	2.72	35.16	145.82	12.94
TX	Dallas-DART	5.24	80.67	2.56	0.58	2.05	31.48	139.64	15.39
TX	Houston-Metro	4.92	74.03	2.14	0.38	2.30	34.65	196.95	15.05
WA	Seattle-Metro	6.59	110.89	3.15	0.47	2.09	35.17	237.72	16.82
	Average of Agencie	$7.25	$85.87	$1.91	$0.55	3.79	44.85	154.81	11.85
	National Average for Bus Mod	$5.59	$72.01	$1.91	$0.52	2.92	37.63	139.71	12.89

Exhibit 16 indicates that the majority of the 15 agencies have at least some exclusive or shared rights-of-way for their bus operations, with 8 of the systems having more than 20 directional route miles of such rights-of-way. Data in this exhibit reflect fixed **guideway** operated by each bus transit agency. In many larger metropolitan areas, several bus agencies operate on the same fixed **guideway** segments. **Exhibit** 60 provides data on the actual segments operated by the 15 top bus agencies. These 15 agencies also account for over 40 percent of the buses operated in maximum service.

The data indicate that, in addition to the secondary role of private providers for the top 15 bus transit systems, the routes served by the top 15 have a commuter orientation, longer trip lengths, and higher average speeds.

As demonstrated **in Exhibit 15**, 3.79 unlinked passenger trips per vehicle revenue mile are realized on average by the combination of the top 15 bus systems, compared with 2.92 for all bus agencies. However, it should be noted that only 8 of the top 15 agencies demonstrate greater unlinked passenger trips per vehicle revenue mile than the 2.92 average for all bus agencies.

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CA	LA-LACMTA	$7.63	$92.45	$1.67	$0.45	4.58	55.48	207.34	12.12
CO	Denver-RTD	4.96	80.85	2.11	0.56	2.35	38.27	143.81	16.29
DC	Washington-WMATA	7.87	87.70	2.00	0.64	3.94	43.91	137.13	11.15
IL	Chicago-RTA-CTA	7.11	74.01	1.56	0.66	4.56	47.49	112.61	10.41
MA	Boston-MBTA	8.75	104.78	2.15	0.79	4.08	48.83	132.71	11.98
MD	Baltimore-Maryland-MTA	6.54	76.10	1.54	0.47	4.25	49.46	163.10	11.64
MN	Minneapolis-St. Paul-MCTO	5.33	75.19	2.00	0.50	2.67	37.67	151.08	14.10
NJ	New Jersey Transit	4.85	79.54	2.90	0.36	1.67	27.42	222.00	16.41
NY	NY-MTA-NYCTA	11.67	91.85	1.73	0.90	6.76	53.18	101.75	7.87
NY	New York City DOT	9.85	98.27	1.97	0.53	5.00	49.84	184.15	9.97
PA	Philadelphia-SEPTA	8.31	84.95	1.77	0.61	4.69	47.90	138.31	10.22
PA	Pittsburgh-PAT	5.94	76.85	2.19	0.53	2.72	35.16	145.82	12.94
TX	Dallas-DART	5.24	80.67	2.56	0.58	2.05	31.48	139.64	15.39
TX	Houston-Metro	4.92	74.03	2.14	0.38	2.30	34.65	196.95	15.05
WA	Seattle-Metro	6.59	110.89	3.15	0.47	2.09	35.17	237.72	16.82
	Average of Agencie	$7.25	$85.87	$1.91	$0.55	3.79	44.85	154.81	11.85
	National Average for Bus Mod	$5.59	$72.01	$1.91	$0.52	2.92	37.63	139.71	12.89

Exhibit 16 indicates that the majority of the 15 agencies have at least some exclusive or shared rights-of-way for their bus operations, with 8 of the systems having more than 20 directional route miles of such rights-of-way. Data in this exhibit reflect fixed **guideway** operated by each bus transit agency. In many larger metropolitan areas, several bus agencies operate on the same fixed **guideway** segments. **Exhibit** 60 provides data on the actual segments operated by the 15 top bus agencies. These 15 agencies also account for over 40 percent of the buses operated in maximum service.

As seen in **Exhibit 18, 6** of the reporting transit agencies exceed the average of 4.20 unlinked passenger trips per vehicle revenue mile and 7 exceed the average of 86.92 unlinked passenger trips per vehicle revenue hour. This is reflective of a high level of service effectiveness for these operators.

Exhibit 18 also offers insight into the relative service efficiency and cost effectiveness of these agencies. Four agencies had operating expenses per vehicle revenue mile of less than the $7.34 national average, and 2 realized operating expenses per vehicle revenue hour of less than the $15 1.70 national average. Five agencies also posted operating expenses per unlinked passenger trip that were lower than the national average of $1.75. Six agencies were equal to or less than the $0.35 national average for operating expenses per passenger mile.

Key Heavy Rail Performance Indicators of Transit Agencies 1994 **Exhibit 18**

ST	Agency Name	Operating Expense				Passenger Trips		Passenger Miles	Vehicle Revenue Miles
		Per Vehicle Revenue Mile (VRM)	Per Vehicle Revenue Hour (VRH)	Per Unlinked Passenger Trip (UPT)	Per Passenger Mile (PM)	Per Vehicle Revenue Mile (VRM)	Per Vehicle Revenue Hour (VRH)	Per Vehicle Revenue Hour (VRH)	Per Vehicle Revenue Hour (MPH)
CA	LA-LACMTA	$34.38	$497.51	$4.32	$2.88	7.95	115.11	172.94	14.47
CA	San Francisco -8ART	4.89	174.83	2.72	0.23	1.80	64.39	760.70	35.78
DC	Washington-WMATA	8.33	219.41	1.71	0.31	4.87	128.36	698.01	26.35
FL	Miami-MDTA	a.62	213.25	3.32	0.42	2.59	64.20	509.33	24.74
GA	Atlanta-MARTA	3.58	93.24	1.07	0.20	3.35	87.13	471.96	26.01
IL	Chicago-RTA-CTA	8.54	158.93	2.09	0.33	3.14	75.26	478.24	23.98
MA	Boston-MBTA	9.11	200.39	1.11	0.37	8.20	1 80.43	548.49	22.00
MD	Baltimore-MDOT	9.01	231.62	3.15	0.60	2.86	73.59	385.83	25.70
NY	NY-MTA-UYCTA	7.47	136.13	1.71	0.38	4.36	79.39	354.69	18.21
NY	NY-MTA-Staten Island	9.88	209.24	3.62	0.49	2.73	57.83	423.88	21.18
NY	Port Authority-PATH	12.18	245.88	2.41	0.55	5.05	101.83	443.7s	20.17
OH	Cleveland-RTA	10.28	266.75	2.84	0.37	3.62	94.03	721.29	26.00
PA	Philadelphia-PATCO	8.32	183.21	2.42	0.28	2.61	75.61	662.84	29.00
PA	Philadelphia-SEPTA	7.70	152.57	1.27	0.29	8.05	119.82	528.65	19.80
	Average	$7.34	$151.70	$1.75	$0.35	4.20	86.92	427.44	20.70

Exhibit 19 also reflects the dominance of the New York City agencies. Nearly 38 percent of heavy rail route miles are accounted for by the New York City area and 44 percent of heavy rail track miles are located there. Nearly 5 1 percent of all heavy rail stations are served by the **three New** York City agencies. Nearly 64 percent of heavy rail vehicles operated in maximum service and 60 percent of heavy rail vehicles available for service are accounted for by the three New York City agencies.

Exhibit 19

Key Heavy Rail Infrastructure Characteristics of Transit Agencies 1994

ST	Agency Name	Fixed Guideway Directional Route Miles	Miles of Track	Number of Stations	Number of Accessible Stations	Vehicles Operated in Maximum Service	Vehicles Available for Maximum Service	Average Fleet Age
CA	LA-LACMTA	6.0	8.8	5	5	16	30	3.0
CA	San Francisco -BART	142.0	196.5	34	34	406	589	16.7
DC	Washington-WMATA	178.2	192.0	74	74	588	764	11.2
FL	Miami-MDTA	42.2	53.2	21	0	76	136	12.0
GA	Atlanta-MARTA	80.8	99.2	33	33	238	238	10.9
IL	Chicago-RTA-CTA	207.7	289.2	145	0	804	1,230	11.6
MA	Boston-MBTA	75.8	107.7	53	33	406	432	16.8
MD	Baltimore-MDOT	26.6	31.6	12	12	48	100	9.4
NY	NY-MTA-NYCTA	492.9	834.2	469	25	4,948	5,803	21.5
NY	NY-MTA-Staten Island	28.6	32.5	22	2	36	64	23.0
NY	Port Authority-PATH	28.6	43.1	13	6	282	342	21.8
OH	Cleveland-RTA	38.2	41.9	18	1	35	60	11.0
PA	Philadelphia-PATCO	31.5	38.4	13	2	102	121	21.4
PA	Philadelphia-SEPTA	76.1	102.3	76	4	292	373	25.1
	Total	1,455.2	2,070.6	988	231	8,277	10,282	
	Weighted Average							18.6

Commuter Rail Agencies

Exhibits 20, 21, and 22 present all 16 commuter rail systems, encompassing 19 individual agencies. Once again, this mode is dominated by two agencies primarily serving the New York City metropolitan area, one serving New Jersey, and one serving the Chicago metropolitan area. As shown in **Exhibit** 20, the systems serving the metropolitan areas of New York-New Jersey and Chicago accounted for 80.7 percent of the total operating expenses for commuter rail systems, 78 percent of the vehicle revenue miles, 77 percent of the vehicle revenue hours, 80.5 percent of the unlinked passenger trips, and 82.5 percent of the passenger miles. Therefore, three individual agencies and one commuter rail system (Chicago) are responsible for over 77 percent of service supplied and consumed for commuter rail in the nation.

Exbibit 20

Key Commuter Rail Operating Characteristics of Transit Agencies 1994

ST	Agency Name	Service	Operating Expense (000s)	Vehicle Revenue Miles (000s)	Vehicle Revenue Hours (000s)	Unlinked Passenger Trips (000s)	Average Weekday Unlinked Passenger Trips (000s)	Passenger Miles (000s)
CA	LA-OCTA	PT	$1,206.5	86.8	2.2	137.6	0.7	5.640.2
CA	LA-SCRRA	PT	42.484.0	3.124.6	77.9	3.291.2	12.9	109.511.8
CA	SF-CALTRANS	PT	39,572.9	3.378.1	112.3	5.607.2	19.2	127.285.5
CT	Hartford-Conn DOT	PT	5.865.2	445.6	10.6	288.7	1.1	5.826.6
FL	Ft. Lauderdale-TCRA	DO	20.888.2	2.451.5	60.9	2.912.9	9.7	96.504.1
IL	Chicago-RTA-Metra		179,424.0	14,474.3	460.6	30,059.5	113.4	622613.6
		PT	130,275.7	17,015.8	509.5	35,812.0	133.4	777,575.3
						65,871.5	246.8	1,400,088.9
IN	NW IN-NICTD Total	DO	309,699.7	31,490.1	970.1	2,588.0	9.3	72.401.4
MA	Boston-MBTA	DO	100,010.0	15.988.7	530.5	23.280.1	83.9	431.390.3
MD	Baltimore-Maryland-MTA	PT	32.414.3	5,928.0	117.6	5052.4	19.6	152,077.4
NJ	New Jersey Transit	DO	330,142.0	38,146.0	1,075.8	46,274.9	161.1	1,035,303.4
		PT	7,825.9	1,395.9	26.2	1,343.1	5.3	51,066.3
	Total		337,967.9	39,541.9	1,102.0	47,618.0	166.4	1,086,369.7
NY	NY-MTA-Long Island RR	DO	662.423.5	54,380.1	1,714.8	97,393.0	343.0	2,272,185.6
NY	NY-MTA-Metro North RR	DO	488,496.4	37,936.8	990.2	62,140.6	215.8	1,843,609.0
PA	Philadelphia-Penn DOT	PT	1.237.7	198.5	3.9	47.4	0.3	2,979.6
PA	Philadelphia-SEPTA	DO	152,846.9	11.574.0	420.8	20.926.2	73.7	330,597.8
VA	VA-VRE	PT	11,818.0	960.9	27.4	1,798.4	7.2	59,443.1
		DO Total	$1,934,204.9	174,547.9	5,313.7	282,662.3	1,000.2	6,608,001.0
		PT Total	$293,588.3	34,985.7	885.5	56,290.8	209.3	1,387,909.9
		Total	$2,227,793.2	209,533.6	6,199.2	338,953.0	1,209.4	7,995,910.9

Exhibit 19

Key Heavy Rail Infrastructure Characteristics of Transit Agencies 1994

ST	Agency Name	Fixed Guideway Directional Route Miles	Miles of Track	Number of Stations	Number of Accessible Stations	Vehicles Operated in Maximum Service	Vehicles Available for Maximum Service	Average Fleet Age
CA	LA-LACMTA	6.0	8.8	5	5	16	30	3.0
CA	San Francisco -BART	142.0	196.5	34	34	406	589	16.7
DC	Washington-WMATA	178.2	192.0	74	74	588	764	11.2
FL	Miami-MDTA	42.2	53.2	21	0	76	136	12.0
GA	Atlanta-MARTA	80.8	99.2	33	33	238	238	10.9
IL	Chicago-RTA-CTA	207.7	289.2	145	0	804	1,230	11.6
MA	Boston-MBTA	75.8	107.7	53	33	406	432	16.8
MD	Baltimore-MDOT	26.6	31.6	12	12	48	100	9.4
NY	NY-MTA-NYCTA	492.9	834.2	469	25	4,948	5,803	21.5
NY	NY-MTA-Staten Island	28.6	32.5	22	2	36	64	23.0
NY	Port Authority-PATH	28.6	43.1	13	6	282	342	21.8
OH	Cleveland-RTA	38.2	41.9	18	1	35	60	11.0
PA	Philadelphia-PATCO	31.5	38.4	13	2	102	121	21.4
PA	Philadelphia-SEPTA	76.1	102.3	76	4	292	373	25.1
	Total	1,455.2	2,070.6	988	231	8,277	10,282	
	Weighted Average							18.6

Commuter Rail Agencies

Exhibits 20, 21, and 22 present all 16 commuter rail systems, encompassing 19 individual agencies. Once again, this mode is dominated by two agencies primarily serving the New York City metropolitan area, one serving New Jersey, and one serving the Chicago metropolitan area. As shown in **Exhibit** 20, the systems serving the metropolitan areas of New York-New Jersey and Chicago accounted for 80.7 percent of the total operating expenses for commuter rail systems, 78 percent of the vehicle revenue miles, 77 percent of the vehicle revenue hours, 80.5 percent of the unlinked passenger trips, and 82.5 percent of the passenger miles. Therefore, three individual agencies and one commuter rail system (Chicago) are responsible for over 77 percent of service supplied and consumed for commuter rail in the nation.

Exbibit 20

Key Commuter Rail Operating Characteristics of Transit Agencies 1994

ST	Agency Name	Service	Operating Expense (000s)	Vehicle Revenue Miles (000s)	Vehicle Revenue Hours (000s)	Unlinked Passenger Trips (000s)	Average Weekday Unlinked Passenger Trips (000s)	Passenger Miles (000s)
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CA	LA-SCRRA	PT	42.484.0	3.124.6	77.9	3.291.2	12.9	109.511.8
CA	SF-CALTRANS	PT	39,572.9	3.378.1	112.3	5.607.2	19.2	127.285.5
CT	Hartford-Conn DOT	PT	5.865.2	445.6	10.6	288.7	1.1	5.826.6
FL	Ft. Lauderdale-TCRA	DO	20.888.2	2.451.5	60.9	2.912.9	9.7	96.504.1
IL	Chicago-RTA-Metra		179,424.0	14,474.3	460.6	30,059.5	113.4	622613.6
		PT	130,275.7	17,015.8	509.5	35,812.0	133.4	777,575.3
						65,871.5	246.8	1,400,088.9
IN	NW IN-NICTD Total	DO	309,699.7	31,490.1	970.1	2,588.0	9.3	72.401.4
MA	Boston-MBTA	DO	100,010.0	15.988.7	530.5	23.280.1	83.9	431.390.3
MD	Baltimore-Maryland-MTA	PT	32.414.3	5,928.0	117.6	5052.4	19.6	152,077.4
NJ	New Jersey Transit	DO	330,142.0	38,146.0	1,075.8	46,274.9	161.1	1,035,303.4
		PT	7,825.9	1,395.9	26.2	1,343.1	5.3	51,066.3
	Total		337,967.9	39,541.9	1,102.0	47,618.0	166.4	1,086,369.7
NY	NY-MTA-Long Island RR	DO	662.423.5	54,380.1	1,714.8	97,393.0	343.0	2,272,185.6
NY	NY-MTA-Metro North RR	DO	488,496.4	37,936.8	990.2	62,140.6	215.8	1,843,609.0
PA	Philadelphia-Penn DOT	PT	1.237.7	198.5	3.9	47.4	0.3	2,979.6
PA	Philadelphia-SEPTA	DO	152,846.9	11.574.0	420.8	20.926.2	73.7	330,597.8
VA	VA-VRE	PT	11,818.0	960.9	27.4	1,798.4	7.2	59,443.1
		DO Total	$1,934,204.9	174,547.9	5,313.7	282,662.3	1,000.2	6,608,001.0
		PT Total	$293,588.3	34,985.7	885.5	56,290.8	209.3	1,387,909.9
		Total	$2,227,793.2	209,533.6	6,199.2	338,953.0	1,209.4	7,995,910.9

modes, but this is not an indication of low utilization of the service. The main reason for the low service effectiveness of commuter rail is related to the concentration of ridership during peak hours combined with the long distances travelled by commuters.

Exhibit 22 also demonstrates the dominance of New York City agencies, as well as New Jersey and Chicago, relative to infrastructure. Commuter rail systems serving those areas account for 75 percent of the vehicles operated in maximum service, 50 percent of the **fixed guideway** directional route miles, and 57 percent of the commuter rail stations.

Exhibit 22

Key Commuter Rail Infrastructure Characteristics of Transit Agencies 1994

ST	Agency Name	Fixed Guideway Directional Route Miles	Miles of Track	Number of Stations	Number of Accessible Stations	Vehicles Operated or Maximum Service	Vehicles Available or Maximum Service	Average fleet Age
CA	IA-OCTA	N/A	N/A	N/A	N/A	5	5	N/A
CA	IA-SCRRA	668.4	460.2	38	38	125	146	1.7
CA	SF-CALTRANS	153.6	153.6	34	0	90	93	8.9
CT	Hartford-Conn DOT	65.6	68.3	7	7	13	25	27.3
FL	Ft. Lauderdale-TCRA	132.8	136.1	15	15	25	31	5.3
IL	Chicago-RTA-Metra	864.4	1.104.6	216	59	952	1,039	18.9
IN	NW IN-NICTD	138.4	89.0	18	7	45	56	8.7
MA	Boston-MBTA	529.8	460.3	101	49	291	346	6.4
MD	Baltimore-Maryland-MTA	373.4	455.1	39	0	107	129	22.6
NJ	New Jersey Transit	1.171.6	1.177.3	163	27	691	825	17.8
NY	NY-MTA-Long Island RR	638.2	701.1	134	15	976	1,184	23.2
NY	NY-MTA-Metro North RR	535.4	751.0	107	0	696	792	19.0
PA	Philadelphia-Penn DOT	144.0	144.0	14	4	12		42.1
PA	Philadelphia-SEPTA	442.8	694.8	181	25	267	3 : :	19.6
VA	VA-VRE	175.0	190.0	16	16	54	71	18.5
	Total	6,033.4	6,585	1,083	262	4,349	5,126	
	Weighted Average							19.2

Light R&Agencies

Also significant is the commuter rail infrastructure of the Northeastern Illinois Regional Commuter Railroad Corporation **(Metra)** and its purchased transportation providers (Burlington Northern Railroad and Chicago **&** Northwestern Transportation Company); Southeastern Pennsylvania Transportation Authority (SEPTA); and the Massachusetts Bay Transportation Authority **(MBTA)**.

Exhibits 23, 24, and 25 provide data for all 19 reporting light rail operators. It should be noted that two new start agencies (St. Louis and Denver) were added for 1994.

Exhibit 23 demonstrates that five agencies, Massachusetts Bay Transportation Authority **(MBTA)** in Boston, Southeastern Pennsylvania Transportation Authority (SEPTA) in Philadelphia, San Francisco Municipal Railway **(Muni),** Los Angeles County Metropolitan **Trans-**portation Authority (LACMTA) in Los Angeles, and the San Diego Trolley, dominate service consumed statistics. These agencies reported over 70 percent of the unlinked passenger trips made via light rail and realized 64 percent of the accumulated passenger miles.

In terms of service supplied, these five agencies also accounted for a majority of vehicle revenue miles and hours. **Combined,** they reported over 59 percent of thevehicle revenue miles and 60.5 percent of vehicle revenue hours.

modes, but this is not an indication of low utilization of the service. The main reason for the low service effectiveness of commuter rail is related to the concentration of ridership during peak hours combined with the long distances travelled by commuters.

Exhibit 22 also demonstrates the dominance of New York City agencies, as well as New Jersey and Chicago, relative to infrastructure. Commuter rail systems serving those areas account for 75 percent of the vehicles operated in maximum service, 50 percent of the **fixed guideway** directional route miles, and 57 percent of the commuter rail stations.

Exhibit 22

Key Commuter Rail Infrastructure Characteristics of Transit Agencies 1994

ST	Agency Name	Fixed Guideway Directional Route Miles	Miles of Track	Number of Stations	Number of Accessible Stations	Vehicles Operated or Maximum Service	Vehicles Available or Maximum Service	Average fleet Age
CA	IA-OCTA	N/A	N/A	N/A	N/A	5	5	N/A
CA	IA-SCRRA	668.4	460.2	38	38	125	146	1.7
CA	SF-CALTRANS	153.6	153.6	34	0	90	93	8.9
CT	Hartford-Conn DOT	65.6	68.3	7	7	13	25	27.3
FL	Ft. Lauderdale-TCRA	132.8	136.1	15	15	25	31	5.3
IL	Chicago-RTA-Metra	864.4	1.104.6	216	59	952	1,039	18.9
IN	NW IN-NICTD	138.4	89.0	18	7	45	56	8.7
MA	Boston-MBTA	529.8	460.3	101	49	291	346	6.4
MD	Baltimore-Maryland-MTA	373.4	455.1	39	0	107	129	22.6
NJ	New Jersey Transit	1.171.6	1.177.3	163	27	691	825	17.8
NY	NY-MTA-Long Island RR	638.2	701.1	134	15	976	1,184	23.2
NY	NY-MTA-Metro North RR	535.4	751.0	107	0	696	792	19.0
PA	Philadelphia-Penn DOT	144.0	144.0	14	4	12		42.1
PA	Philadelphia-SEPTA	442.8	694.8	181	25	267	3 : :	19.6
VA	VA-VRE	175.0	190.0	16	16	54	71	18.5
	Total	6,033.4	6,585	1,083	262	4,349	5,126	
	Weighted Average							19.2

Light R&Agencies

Also significant is the commuter rail infrastructure of the Northeastern Illinois Regional Commuter Railroad Corporation **(Metra)** and its purchased transportation providers (Burlington Northern Railroad and Chicago **&** Northwestern Transportation Company); Southeastern Pennsylvania Transportation Authority (SEPTA); and the Massachusetts Bay Transportation Authority **(MBTA)**.

Exhibits 23, 24, and 25 provide data for all 19 reporting light rail operators. It should be noted that two new start agencies (St. Louis and Denver) were added for 1994.

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In terms of service supplied, these five agencies also accounted for a majority of vehicle revenue miles and hours. **Combined,** they reported over 59 percent of thevehicle revenue miles and 60.5 percent of vehicle revenue hours.

Exhibit 25 shows that the same five agencies mentioned above accounted for 6 1.5 percent of the vehicles operated in maximum service, over 47 percent of the light rail stations, and 46.2 percent of the directional route miles.

Exhibit 25

Key Light Rail Infrastructure Characteristics of Transit Agencies 1994

ST	Agency Name	Fixed Guideway Directional Route Miles	Miles of Track	Number of Stations	Number of Accessible Stations	Vehicles Operated in Maximum Service	Vehicles Available for Maximum Service	Average Fleet Age
CA	LA-LACMTA	43.2	46.7	22	22	36	54	5.0
CA	Sacramento-RT	36.2	34.0	26	0	32	36	5.9
CA	San Diego-The Trolley	41.5	41.5	35	35	59	71	8.1
CA	San Francisco-Muni	49.7	54.2	9	9	101	126	20.6
CA	San Jose-SCCTD	39.0	41.1	33	5	32	54	12.0
CO	Denver-RTD	10.6	12.7	15	15	10	11	1.0
IA	New Orleans-RTA	16.0	12.7	2	0	22	44	69.9
M	A Boston-MBTA	55.9	77.5	95	0	177	209	13.7
MD	Baltimore-Maryland-MTA	43.6	35.3	24	24	30	35	2.0
MO	St. Louis-Bi-State	26.0	30.4	17	17	26	31	1.3
NJ	New Jersey Transit	8.3	6.3	11	0	16	22	27.5
NY	Buffalo-NFTA	12.4	14.1	14	14	23	27	10.0
OH	Cleveland-RTA	26.7	28.9	29	0	26	49	13.0
OR	Portland-Tri-Met	30.2	29.1	27	2	23	26	9.1
PA	Philadelphia-SEPTA	69.3	171.0	64	0	100	147	14.9
PA	Pittsburgh-PAT	36.1	46.5	13	0	44	71	17.3
TN	Memphis-MATA	4.3	4.0	20	20	5	7	1.6
TX	Galveston-Island Transit	4.7	4.7	3	1	4	4	6.0
WA	Seattle-Metro	4.2	2.1	14	0	3	5	66.2
	Tote	561.9	694.8	475	164	789	1,031	
	Weighted Averag							14.3

Demand Response Agencies

The 15 demand response agencies listed **in Exhibits 26, 27,** and 28 are those reporting the most vehicles operating in maximum **service. As Exhibit** 26 demonstrates, these agencies reported over 36 percent of the total demand response service operated in the United States in terms of vehicle revenue miles. These agencies carried over 30 percent of the nation's demand response riders and realized over 33 percent of the demand response passenger miles. This is the only mode in the NTD in which the participation of the private sector is higher than that of the public sector. Private providers generated over 93 percent of the vehicle revenue miles, 95 percent of the vehicle revenue hours, and 95.6 percent of the unlinked passenger trips in 1994.

Performance measure indicators for demand response are displayed **in Exhibit 27. The** exhibit demonstrates that 8 of these 15 demand response agencies operated more efficiently than the national average in terms of service supplied based on cost per vehicle revenue mile. In terms of cost effectiveness of the service consumed, a majority of these agencies were not as effective as the national average based on cost per unlinked passenger trip and per passenger mile. As for the service effectiveness of these agencies, only four are better than the national average, as measured by unlinked passenger trips per vehicle revenue miles. This low service effectiveness is not surprising, given the fact that demand response service becomes less effective as the demand for this mode increases. This is due to the low capacity nature of demand response combined with its operational characteristics.

Exhibit 25 shows that the same five agencies mentioned above accounted for 6 1.5 percent of the vehicles operated in maximum service, over 47 percent of the light rail stations, and 46.2 percent of the directional route miles.

Exhibit 25

Key Light Rail Infrastructure Characteristics of Transit Agencies 1994

ST	Agency Name	Fixed Guideway Directional Route Miles	Miles of Track	Number of Stations	Number of Accessible Stations	Vehicles Operated in Maximum Service	Vehicles Available for Maximum Service	Average Fleet Age
CA	LA-LACMTA	43.2	46.7	22	22	36	54	5.0
CA	Sacramento-RT	36.2	34.0	26	0	32	36	5.9
CA	San Diego-The Trolley	41.5	41.5	35	35	59	71	8.1
CA	San Francisco-Muni	49.7	54.2	9	9	101	126	20.6
CA	San Jose-SCCTD	39.0	41.1	33	5	32	54	12.0
CO	Denver-RTD	10.6	12.7	15	15	10	11	1.0
LA	New Orleans-RTA	16.0	12.7	2	0	22	44	69.9
M A	Boston-MBTA	55.9	77.5	95	0	177	209	13.7
MD	Baltimore-Maryland-MTA	43.6	35.3	24	24	30	35	2.0
MO	St. Louis-Bi-State	26.0	30.4	17	17	26	31	1.3
NJ	New Jersey Transit	8.3	6.3	11	0	16	22	27.5
NY	Buffalo-NFTA	12.4	14.1	14	14	23	27	10.0
OH	Cleveland-RTA	26.7	28.9	29	0	26	49	13.0
OR	Portland-Tri-Met	30.2	29.1	27	2	23	26	9.1
PA	Philadelphia-SEPTA	69.3	171.0	64	0	100	147	14.9
PA	Pittsburgh-PAT	36.1	46.5	13	0	44	71	17.3
TN	Memphis-MATA	4.3	4.0	20	20	5	7	1.6
TX	Galveston-Island Transit	4.7	4.7	3	1	4	4	6.0
WA	Seattle-Metro	4.2	2.1	14	0	3	5	66.2
	Tot	561.9	694.8	475	164	789	1,031	
	Weighted Averag							14.3

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The 15 demand response agencies listed **in Exhibits 26, 27,** and 28 are those reporting the most vehicles operating in maximum **service. As Exhibit** 26 demonstrates, these agencies reported over 36 percent of the total demand response service operated in the United States in terms of vehicle revenue miles. These agencies carried over 30 percent of the nation's demand response riders and realized over 33 percent of the demand response passenger miles. This is the only mode in the NTD in which the participation of the private sector is higher than that of the public sector. Private providers generated over 93 percent of the vehicle revenue miles, 95 percent of the vehicle revenue hours, and 95.6 percent of the unlinked passenger trips in 1994.

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Data about infrastructure for demand response are displayed in Exhibit 28. It shows that 4,933 demand response vehicles are operated in maximum service by the 15 agencies presented. This represents 38.4 percent of all demand response vehicles operated nationally in maximum service.

Exhibit 28

Key Demand Response Infrastructure Characteristics of Transit Agencies 1994

ST	Agency Name	Operating Expense (000s)	Vehicles Operated in Maximum Service	Vehicles Available for Maximum Service	Average Fleet Age
CA	LA-OCTA	$13,371.9	219	260	4.0
CA	LA-LACMTA	9,955.0	199	199	4.9
FL	Ft. Lauderdale-Bct	8,149.2	427	448	2.4
FL	Miami-MDTA/Comprehensive	25,393.0	423	437	1.7
HI	Honolulu-HDOT-Mayflower	9,364.7	184	239	2.4
IL	Chicago-RTA-CTA	23,070.1	1,034	1,054	2.1
IL	Chicago-RTA-Pace	13,660.7	330	352	3.3
MA	Fitchburg-MART	25,526.8	230	258	3.2
PA	Philadelphia-SEPTA	23,309.8	265	296	1.7
PA	Pittsburgh-PAT/ACCESS	20,806.1	413	468	4.2
TX	Dallas-DART	14,903.0	319	369	2.3
TX	Houston-Metro	9,134.3	211	1,926	2.2
TX	San Antonio-VIA	14,001.1	200	212	4.4
WA	Seattle-Metro	11,854.7	205	421	2.1
WI	Milwaukee-Paratransit	7,924.5	274	391	4.6
	Agencies Total	$230,424.8	4,933	7,330	
	Weighted Average				3.3
	Total Demand Response Mode	$633,896.3	12,828	17,447	
	Weighted Average				3.7

Trolleybus Agencies

Exhibits 29, 30, and 31 provide data regarding the five trolleybus agencies included in the NTD. This mode consists of rubber-tired vehicles supplied with electric power from overhead lines. The mode has remained relatively stable since 1990 in both service supplied and consumed. As seen in Exhibit 29, the San Francisco-Muni transit agency accounted for over 54 percent of the vehicle revenue miles operated, over 61 percent of the vehicle revenue hours, 67 percent of the trolleybus riders carried, and 61 percent of the passenger miles realized.

Exhibit 29

Key Trolleybus Operating Characteristics of Transit Agencies 1994

ST	Agency Name	Type of Service	Operating Expense (000s)	Vehicle Revenue Miles (000s)	Vehicle Revenue Hours (000s)	Unlinked Passenger Trips (000s)	Average Weekday Unlinked Passenger Trips (000s)	Passenger Miles (000s)
CA	San Francisco-Muni	DO	$73,322.2	7,144.9	993.0	78,752.1	243.8	113.224.1
MA	Boston-MBTA	DO	822.5	743.5	57.2	3.274.8	11.2	7.794.9
OH	Dayton-RTA	DO	8,171.6	1.176.1	111.4	2,708.5	9.0	6.899.4
PA	Philadelphia-SEPTA	DO	9.265.1	832.3	100.5	10,155.0	34.1	17,361.4
WA	Seattle-Metro	DO	33,952.0	3,256.0	351.4	22,610.2	72.2	41,644.8
		Total	$125,533.4	13,152.8	1,613.5	117,500.5	370.3	186,924.5

Data about infrastructure for demand response are displayed **in Exbibit 28.** It shows that 4,933 demand response vehicles are operated in maximum service by the 15 agencies presented. This represents 38.4 percent of all demand response vehicles operated nationally in maximum service.

Exhibit 28

Key Demand Response Infrastructure Characteristics of Transit Agencies 1994

ST	Agency Name	Operating Expense (000s)	Vehicles Operated in Maximum Service	Vehicles Available for Maximum Service	Average Fleet Age
CA	LA-OCTA	$13,371.9	219	260	4.0
CA	LA-LACMTA	9,955.0	199	199	4.9
FL	Ft. Lauderdale-Bct	8,149.2	427	448	2.4
FL	Miami-MDTA/Comprehensive	25,393.0	423	437	1.7
HI	Honolulu-HDOT-Mayflower	9,364.7	184	239	2.4
IL	Chicago-RTA-CTA	23,070.1	1,034	1,054	2.1
IL	Chicago-RTA-Pace	13,660.7	330	352	3.3
MA	Fitchburg-MART	25,526.8	230	258	3.2
PA	Philadelphia-SEPTA	23,309.8	265	296	1.7
PA	Pittsburgh-PAT/ACCESS	20,806.1	413	468	4.2
TX	Dallas-DART	14,903.0	319	369	2.3
TX	Houston-Metro	9,134.3	211	1,926	2.2
TX	San Antonio-VIA	14,001.1	200	212	4.4
WA	Seattle-Metro	11,854.7	205	421	2.1
WI	Milwaukee-Paratransit	7,924.5	274	391	4.6
	Agencies Total	$230,424.8	4,933	7,330	
	Weighted Average				3.3
	Total Demand Response Mode	$633,896.3	12,828	17,447	
	Weighted Average				3.7

Trolleybus Agencies

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Exhibit 29

Key Trolleybus Operating Characteristics of Transit Agencies 1994

ST	Agency Name	Type of Service	Operating Expense (000s)	Vehicle Revenue Miles (000s)	Vehicle Revenue Hours (000s)	Unlinked Passenger Trips (000s)	Average Weekday Unlinked Passenger Trips (000s)	Passenger Miles (000s)
CA	San Francisco-Muni	DO	$73,322.2	7.144.9	993.0	78,752.1	243.0	113.224.1
MA	Boston-MBTA	DO	822.5	743.5	57.2	3.274.8	11.2	7.794.9
OH	Dayton-RTA	DO	8,171.6	1.176.1	111.4	2,708.5	9.0	6,899.4
PA	Philadelphia-SEPTA	DO	9.265.1	932.3	100.5	10,155.0	34.1	17,361.4
WA	Seattle-Metro	DO	33,952.0	3,256.0	351.4	22,610.2	72.2	41,644.8
		Total	$125,533.4	13,152.8	1,613.5	117,500.5	370.3	186,924.5

Ferryboat Agencies

Exhibits 32, 33, and 34 offer information on the nation's 14 ferryboat agencies included in the NTD. **Exhibit** 32 shows that the Washington State Department of Transportation operating in Seattle reports over 46 percent of the vehicle revenue miles operated, nearly 42 percent of the vehicle revenue hours operated, 30.2 percent of the unlinked passenger trips, and 44.5 percent of the passenger miles.

Purchased transportation consumes 8.43 percent of the total operating expenses for ferryboat and generates 2 1.2 percent of the total vehicle revenue miles.

Exhibit 32

Key Ferryboat Operating Characteristics of Transit Agencies 1994

ST	Agency Neme	Type of Service	Operating Expense (000s)	Vehicle Revenue Miles (000s)	Vehicle Revenue Hours (000s)	Unlinked Passenger Trips (000s)	Average Weekday Unlinked Passenger Trips (000s)	Passenger Mile; (000s)
CA	Oakland-AOFS	PT	$1,838.2	106.5	6.2	371.7	1.1	2,490.E
CA	Oakland-Vallejo Transit	PT	2,008.7	71.8	3.4	193.7	0.5	6,004.5
CA	SF-Golden Gate	DO	10.096.9	138.7	11.0	1,403.8	4.5	15,162.C
CT	Hartford-Corm DOT	DO	530.5	6.1	4.7	172.2	0.6	36.1
I A	New Orleans-Cresent City	DO	4.166.5	46.1	23.1	4,005.6	11.4	2,002.8
MA	Boston-MBTA	PT	3.675.2	1 DO.0	7.1	811.8	3.0	6,025.9
ME	Portland-CBL	DO	1.579.9	62.2	13.7	668.8	2.1	2,274.1
NY	New York City DOT	DO	31.606.2	169.3	16.3	17.523.3	59.4	91,121.c
NY	Port Authority-PATH	PT	4.694.0	86.7	10.0	2.355.0	8.8	4,003.C
PR	San Juan-Port Authority	DO	8,129.3	259.0	47.0	1,689.4	4.4	4,039.:
VA	Norfolk-TRT	PT	523.1	12.2	6.1	485.4	1.3	242.7
WA	Bremerton-Kitsap Transit	PT	643.2	42.8	10.7	403.0	1.5	377.e
WA	Seattle-Washinoton DOT	DO	113.521.3	993.0	119.6	13.099.6	35.3	108,201.:
WA	Tacoma-Pierce Ferry	PT	920.3	31.o	4.9	140.9	0.4	1,029.5
		DO Total	$169,630.5	1,676.5	235.3	38,562.7	117.8	222,838.4
		PT Total	$14,302.7	461 .0	50.4	4,761.4	16.6	20,173.5
		Total	$183,933.2	2,127.4	285.6	43,324.1	134.3	243,012.4

Exhibit 33 reflects the high cost of ferryboat service and also shows its high service effectiveness. The Staten Island Ferry operated by the New York City Department of Transportation realized over 103 unlinked passenger trips per mile and over 1,070 unlinked passenger trips per hour.

Exhibit 33

Key Ferryboat Performance Indicators of Transit Agencies 1994

ST	Agency Name	Operating Expense: Per Vehicle Revenue Mile (VRM)	Operating Expense: Per Vehicle Revenue Hour (VRH)	Operating Expense: Per Unlinked Passenger Trip (UPT)	Passenger: Per Passenger Mile (PM)	Passenger: Per Vehicle Revenue Mile (VRM)	Passenger: Per Vehicle Revenue Hour (VRH)	Passenger Miles: Per Vehicle Revenue Hour (VRH)	Vehicle Revenue Miles: Per Vehicle Revenue Hour (MPH)
CA	Oakland-AOFS	617.26	6224.94	$4.95	$0.74	3.49	45.48	304.60	13.03
CA	Oakland-Vallejo Transit	27.98	695.16	10.37	0.33	2.70	57.39	1.779.10	21.27
CA	SF-Golden Gate	72.82	920.07	7.19	0.67	10.12	127.92	1,381.63	12.63
CT	Hartford-Corm DOT	65.13	ii 2.58	3.08	13.94	21.15	36.55	8.08	1.73
LA	New Orleans-Cresent City	90.36	1 80.68	1.04	2.08	86.87	173.70	66.85	2.00
MA	Boston-MBTA	36.76	514.52	4.53	0.61	8.12	113.65	843.61	14.00
ME	Portland-CBL	25.39	115.31	2.36	0.69	10.75	48.82	165.98	4.54
NY	New York City DOT	186.72	1,941.89	1.80	0.35	103.52	1,076.63	5,598.49	10.49
NY	Port Authority-PATH	54.14	471.76	1.99	1.17	27.16	236.68	402.31	8.71
PR	San Juan-Port Authority	31.39	172.96	4.81	2.01	6.52	35.94	86.94	6.51
VA	Norfolk-TRT	42.94	86.22	1.08	2.16	39.84	80.01	40.01	2.01
WA	Bremerton-Kitsap Transit	15.02	69.90	1.60	1.70	9.41	37.53	35.17	3.99
WA	Seattle-Washington DOT	114.32	949.59	a.67	1.05	13.19	109.58	905.09	8.31
WA	Tacoma-Pierce Ferry	29.70	187.69	6.53	0.89	4.54	28.72	209.96	6.32
	Averag	$86.45	$644.02	$4.24	$0.76	20.36	161.70	850.88	7.45

Ferryboat Agencies

Exhibits 32, 33, and 34 offer information on the nation's 14 ferryboat agencies included in the NTD. **Exhibit** 32 shows that the Washington State Department of Transportation operating in Seattle reports over 46 percent of the vehicle revenue miles operated, nearly 42 percent of the vehicle revenue hours operated, 30.2 percent of the unlinked passenger trips, and 44.5 percent of the passenger miles.

Purchased transportation consumes 8.43 percent of the total operating expenses for ferryboat and generates 2 1.2 percent of the total vehicle revenue miles.

Exhibit 32

Key Ferryboat Operating Characteristics of Transit Agencies 1994

ST	Agency Name	Type of Service	Operating Expense (000s)	Vehicle Revenue Miles (000s)	Vehicle Revenue Hours (000s)	Unlinked Passenger Trips WOOS)	Average Weekday Unlinked Passenger Trips (000s)	Passenger Mile; (000s)
CA	Oakland-AOFS	PT	$1,838.2	106.5	6.2	371.7	1.1	2,490.E
CA	Oakland-Vallejo Transit	PT	2,008.7	71.6	3.4	193.7	0.5	6,004.5
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CT	Hartford-Conn DOT	0 0	530.5	6.1	4.7	172.2	0.6	36.1
I A	New Orleans-Cresent City	DO	4.166.5	46.1	23.1	4,005.6	11.4	2,002.8
MA	Boston-MBTA	PT	3.675.2	loo.0	7.1	611.6	3.0	6,025.9
ME	Portland-CBL	DO	1,579.9	62.2	13.7	666.6	2.1	2,274.1
NY	New York City DOT	DO	31.606.2	169.3	16.3	17.523.3	59.4	91,121.c
NY	Port Authority-PATH	PT	4.694.0	86.7	10.0	2.355.0	8.8	4,003.C
PR	San Juan-Port Authority	DO	8,129.3	259.0	47.0	1,689.4	4.4	4,039.:
VA	Norfolk-TRT	PT	523.1	12.2	6.1	465.4	1.3	242.7
WA	Bremerton-Kitsap Transit	PT	643.2	42.8	10.7	403.0	1.5	377.E
WA	Seattle-Washinoton DOT	DO	113.521.3	993.0	119.6	13.099.6	35.3	106,201.:
WA	Tacoma-Pierce Ferry	PT	920.3	31.o	4.9	140.6	0.4	1,029.5
		DO Total	$169,630.5	1,676.5	235.3	38,562.7	117.8	222,838.4
		PT Total	$14,302.7	461 .0	50.4	4,761.4	16.6	20,173.5
		Total	$183,933.2	2,127.4	285.6	43,324.1	134.3	243,012.4

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Exbibit 33

Key Ferryboat Performance Indicators of Transit Agencies 1994

ST	Agency Name	Operating Expense: Per Vehicle Revenue Mile (VRM)	Operating Expense: Per Vehicle Revenue Hour (VRH)	Operating Expense: Per Unlinked Passenger Trip (UPT)	Passenger: Per Passenger Mile (PM)	Passenger: Per Vehicle Revenue Mile (VRM)	Passenger: Per Vehicle Revenue Hour (VRH)	Passenger Miles: Per Vehicle Revenue Hour (VRH)	Vehicle Revenue Miles: Per Vehicle Revenue Hour (MPH)
CA	Oakland-AOFS	617.26	6224.94	$4.95	$0.74	3.49	45.48	304.80	13.03
CA	Oakland-Vallejo Transit	27.98	595.16	10.37	0.33	2.70	57.39	1.779.10	21.27
CA	SF-Golden Gate	72.82	920.07	7.19	0.67	10.12	127.92	1,381.63	12.63
CT	Hartford-Conn DOT	65.13	ii 2.58	3.08	13.94	21.15	36.55	8.08	1.73
LA	New Orleans-Cresent City	90.36	1 80.68	1.04	2.08	86.87	173.70	96.85	2.00
MA	Boston-MBTA	36.76	514.52	4.53	0.61	8.12	ii 3.65	843.61	14.00
ME	Portland-CBL	25.39	115.31	2.36	0.69	10.75	48.82	165.98	4.54
NY	New York City DOT	186.72	1,941.89	1.80	0.35	103.52	1,076.63	5,598.49	10.40
NY	Port Authority-PATH	54.14	471.76	1.99	1.17	27.16	236.68	402.31	8.71
PR	San Juan-Port Authority	31.39	172.96	4.81	2.01	6.52	35.94	85.94	5.51
VA	Norfolk-TRT	42.94	86.22	1.08	2.16	39.84	80.01	40.01	2.01
WA	Bremerton-Kitsap Transit	15.02	59.90	1.60	1.70	9.41	37.53	35.17	3.99
WA	Seattle-Washington DOT	114.32	949.59	8.67	1.05	13.19	109.58	905.09	8.31
WA	Tacoma-Pierce Ferry	29.70	187.69	6.53	0.89	4.54	28.72	209.96	6.32
	Averag	$86.45	$644.02	$4.24	$0.76	20.36	151.70	850.88	7.45

Performance measures for automated guideway systems are displayed in Exhibit 36. The efficiency (cost per revenue mile) of these systems correlates to the amount of service supplied. The agencies with the poorest efficiency are Miami and Detroit, and they are the greatest providers of automated guideway service. The new system in Tampa displays the best service effectiveness among automated guideway agencies.

Exhibit 36

Key Automated Guideway Performance Indicators of Transit Agencies 1994

ST	Agency Name	Operating Expense				Passenger Trips		Passenger Miles	Vehicle Revenue Miles
		Per Vehicle Revenue Mile (VRM)	Per Vehicle Revenue Hour (VRH)	Per Unlinked Passenger Trip (UPT)	Per Passenger Mile (PM)	Per Vehicle Revenue Mile (VRM)	Per Vehicle Revenue Hour (VRH)	Per Vehicle Revenue Hour (VRH)	Per Vehicle Revenue Hour (MPH)
FL	Jacksonville-JTA	$9.95	8137.92	$2.67	$4.60	3.72	61.62	30.01	13.66
FL	Miami-MDTA	20.17	219.61	2.98	2.95	6.76	73.66	74.39	10.90
FL	Tampa-Hartline	2.94	11.65	0.28	0.64	10.63	42.10	la.10	3.96
MI	Detroit-DTC	15.53	160.13	3.20	2.26	4.84	56.20	79.87	11.60
	Average	$16.94	$181.70	$2.89	$2.61	5.85	62.79	69.51	10.72

Infrastructure data for automated guideway agencies are shown in Exhibit 37. It shows that automated guideway systems have limited infrastructure and serve small portions of the metropolitan areas where they are located. Miami is the system with the highest amount of fixed guideway directional route miles as well as vehicles operated in maximum service.

Exhibit 37

Key Automated Guideway Infrastructure Characteristics of Transit Agencies 1994

ST	Agency Name	Fixed Guideway Directional Route Miles	Vehicles Operated in Maximum Service	Vehicles Available for Maximum Service	Average Fleet Age
FL	Jacksonville-JTA	1.2	2	2	5.0
FL	Miami-MDTA	8.5	19	29	3.9
FL	Tampa-Hartline	0.9	2	2	9.0
MI	Detroit-DTC	2.9	8	8	8.0
	Total	13.5	31	41	
	Weighted Average				5.3

Performance measures for automated guideway systems are displayed in Exhibit 36. The efficiency (cost per revenue mile) of these systems correlates to the amount of service supplied. The agencies with the poorest efficiency are Miami and Detroit, and they are the greatest providers of automated guideway service. The new system in Tampa displays the best service effectiveness among automated guideway agencies.

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FL	Miami-MDTA	20.17	219.61	2.98	2.95	6.76	73.66	74.39	10.90
FL	Tampa-Hartline	2.94	11.65	0.28	0.64	10.63	42.10	la.10	3.96
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	Total	13.5	31	41	
	Weighted Average				5.3

Exhibit 38
National Transit Profile
for Urbanized Areas With Less Than 200,000 Population
1994

General Information (System Wide)

Service Consumption (millions)

Annual Passenger Miles	952.8
Annual Unlinked Trips	237.2
Average Weekday Unlinked Trips	0.8
Average Saturday Unlinked Trips	0.4
Average Sunday Unlinked Trips	0.1

Service supplied

Annual Vehicle Revenue Miles (millions)	179.7
Annual Vehicle Revenue Hours (millions)	13.0
Total Fleet	7,837
Vehicles Operated in Maximum Service	6,308
Base Period Requirement	2,102

Vehicles Operated in Maximum Service

Directly operated	Vehicles	Agencies *
Bus	3,006	154
Light Rail	4	1
Demand Response	1,017	93
Other	220	8
Total	**4,247**	**256**

Purchased Transportation	Vehicles	Agencies *
Bus	532	40
Light Rail	0	0
Demand Response	1,517	2
Other	12	151
Total	**2,061**	

Financial Information (System Wide)

Sources of Operating Funds Expended (millions)

Passenger Fares	$120.5
Local Funds	176.0
State Funds	131.9
Federal Assistance	105.1
Other Funds	17.7
Total Operating Funds Expended	.

Summary of Operating Expenses (millions)

Salaries/Wages/Benefits	$311.8
Materials & Supplies	57.6
Purchased Transportation	103.6
Other Expenses	67.2
Total Operating Expenses	**$540.1**
Reconciling Cash Expenditures (millions)	$10.1

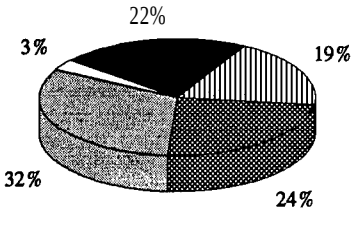
Sources of Capital Funds Expended (millions)

Local Funds	$29.2
State Funds	22.9
Federal Assistance	62.2
Total Capital Funds Expended	.

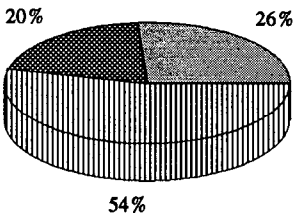
Uses of Capital Funds (millions)

	Rolling stock	Facilities and Other	Total
Bus	$62.3	$40.2	$102.5
Light Rail	0.0	0.0	0.0
Demand Response	8.0	2.1	10.2
Other	0.8	0.6	1.4
Total	**$71.2**	**$42.**	.

Sources of Operating Funds Expended



Sources of Capital Funds Expended



* Number of Agencies by Mode

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National Transit Profile
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1994

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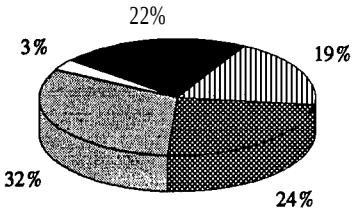
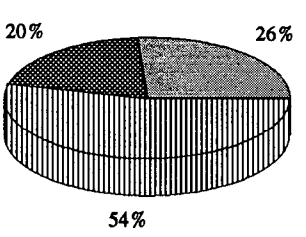
Light Rail	0.0	0.0	0.0
Demand Response	8.0	2.1	10.2
Other	0.8	0.6	1.4
Total	$71.2	$42.	.

Sources of Operating Funds Expended



Sources of Capital Funds Expended



* Number of Agencies by Mode

Exhibit 40
National Transit Profile
for Urbanized Areas With Over 1 Million Population
1994

General Information (System Wide)

Service Consumption (millions)	
Annual Passenger Miles	34,149.8
Annual Unlinked Trips	6,778.7
Average Weekday Unlinked Trips	22.4
Average Saturday Unlinked Trips	11.8
Average Sunday Unlinked Trips	7.9

Service Supplied	
Annual Vehicle Revenue Miles (millions)	2,124.3
Annual Vehicle Revenue Hours (millions)	140.7
Total Fleet	69,959
Vehicles Operated in Maximum Service	55,970
Base Period Requirement	25,446

Vehicles Operated in Maximum Service Directly Operated	Vehicles	Agencies *
Bus	29,949	90
Heavy Rail	8,277	14
Commuter Rail	3,828	9
Light Rail	737	16
Demand Response	1,142	47
Other	1,325	21
Total	45,258	197

Purchased Transportation	Vehicles	Agencies *
Bus	2,176	53
Heavy Rail	0	0
Commuter Rail	508	9
Light Rail	0	0
Demand Response	6,312	75
Other	1,716	13
Total	, 12	150

Financial Information (System Wide)

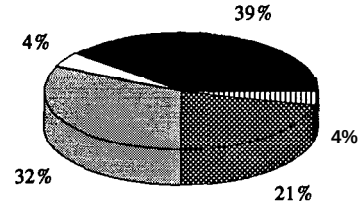
Sources of Operating Funds Expended (millions)	
Passenger Fares	$6,017.6
Local Funds	4,945.1
State Funds	3,218.3
Federal Assistance	591.9
Other Funds	516.9
Total Operating Funds Expended	15,290.0

summary of Operating Expenses (millions)	
Salaries/Wages/Benefits	$10,971.5
Materials & Supplies	1,298.3
Purchased Transportation	761 .0
Other Expenses	1,355.0
Total Operating Expenses	$14,385.9
Reconciling Cash Expenditures (millions)	$922.7

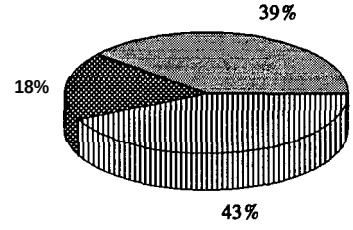
Sources of Capital Funds Expended (millions)	
Local Funds	$1996.1
State Funds	932.4
Federal Assistance	2,253.0
Total Capital Funds Expended	$5,181.5

Uses of Capital Funds (millions)	Rolling Stock	Facilities and Other	Total
Bus	$443.7	$609.8	$1,053.5
Heavy Rail	212.6	1,852.9	2,065.5
Commuter Rail	225.1	1,099.8	1,324.9
Light Rail	56.1	464.0	520.1
Demand Response	19.9	6.7	26.6
Other	95.6	95.3	190.9
Total	1,053.0	$4,128.6	,1 1.

Sources of Operating Funds Expended



Sources of Capital Funds Expended



* Number of Agencies by Mode

Exhibit 40
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1994

General Information (System Wide)

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Average Weekday Unlinked Trips	22.4
Average Saturday Unlinked Trips	11.8
Average Sunday Unlinked Trips	7.9

Service Supplied	
Annual Vehicle Revenue Miles (millions)	2,124.3
Annual Vehicle Revenue Hours (millions)	140.7
Total Fleet	69,959
Vehicles Operated in Maximum Service	55,970
Base Period Requirement	25,446

Vehicles Operated in Maximum Service Directly Operated	Vehicles	Agencies *
Bus	29,949	90
Heavy Rail	8,277	14
Commuter Rail	3,828	9
Light Rail	737	16
Demand Response	1,142	47
Other	1,325	21
Total	45,258	197

Purchased Transportation	Vehicles	Agencies *
Bus	2,176	53
Heavy Rail	0	0
Commuter Rail	508	9
Light Rail	0	0
Demand Response	6,312	75
Other	1,716	13
Total	, 12	150

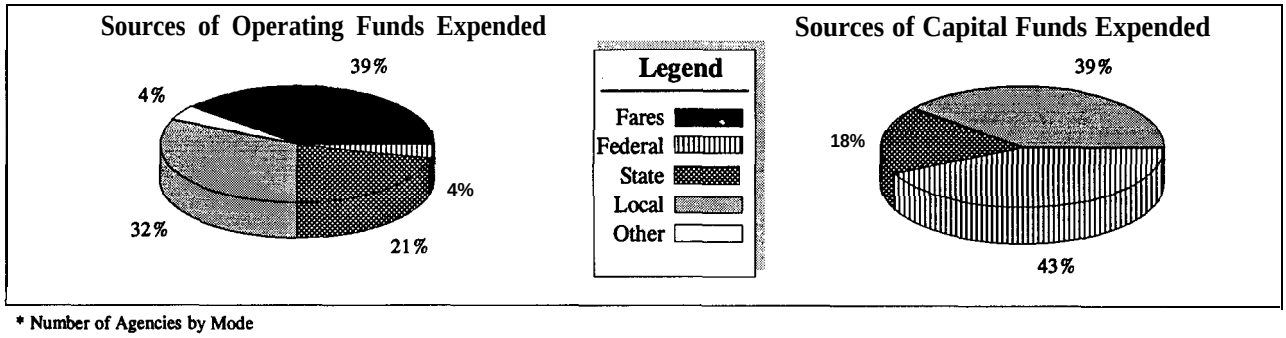
Financial Information (System Wide)

Sources of Operating Funds Expended (millions)	
Passenger Fares	$6,017.6
Local Funds	4,945.1
State Funds	3,218.3
Federal Assistance	591.9
Other Funds	516.9
Total Operating Funds Expended	15,290.0

summary of Operating Expenses (millions)	
Salaries/Wages/Benefits	$10,971.5
Materials & Supplies	1,298.3
Purchased Transportation	761 .0
Other Expenses	1,355.0
Total Operating Expenses	$14,385.9
Reconciling Cash Expenditures (millions)	$922.7

Sources of Capital Funds Expended (millions)	
Local Funds	$1996.1
State Funds	932.4
Federal Assistance	2,253.0
Total Capital Funds Expended	$5,181.5

Uses of Capital Funds (millions)	Rolling Stock	Facilities and Other	Total
Bus	$443.7	$609.8	$1,053.5
Heavy Rail	212.6	1,852.9	2,065.5
Commuter Rail	225.1	1,099.8	1,324.9
Light Rail	56.1	464.0	520.1
Demand Response	19.9	6.7	26.6
Other	95.6	95.3	190.9
Total	1,053.0	$4,128.6	,1 1.



* Number of Agencies by Mode

Exhibit 42

Multiple State Urbanized Areas
1994

Urbanized Areas	UZAs	50,000 to 199,999	200,000 to 1 Million	Over 1 Million
Within One State	352	252	74	26
Within Two States	46	24	15	7
Within Three States	6	4	1	1
Within Four States	1		1	-
Total	405	280	91	34

The number of UZAs reporting by mode and type of service is displayed **in Exhibit 43.** Almost all transit agencies with the largest infrastructures intended primarily to support rail systems are located in the largest UZAs. This is because of several factors, not the least of which is a large population base that can support rail system modes. The largest UZAs have a high density development and well defined transportation corridors, all of which make rail modes extremely attractive. Of the three rail modes identified **in Exhibit 43, only** four transit agencies provide some form of rail service that operates in UZAs of less than 1 million population. Most UZAs are served by a combination of bus and demand response transit agencies, because these modes are less capital intensive and more flexible in serving areas with a low population density.

Exhibit 43

Number of Urbanized Areas Reporting by Mode and Type of Service
1994

UZA Size		Mode					
		MB	HR	CR	LR	DR	Other
Under 200,000 Population	DO	165	0	0	1	103	8
	PT	42	0	0	0	116	2
Total		207	0	0	1	219	10
200,000 to 1 Million Population	DO	45	0	0	2	45	10
	PT	29	0	1	0	72	5
Total		74	0	1	2	117	15
Over 1 Million Population	DO	94	14	9	16	50	21
	PT	53	0	9	0	23	9
Total		147	14	18	16	73	30
Directly Operated	DO	354	14	9	19	198	39
Purchased Transportation	PT	124	0	10	0	261	16
Total		478	14	19	19	459	55

The number of UZAs reporting continued to increase during the 1990-l 994 **timeframe.** The increase in the number of UZAs reporting was 10.6 percent between 1990 and 1994. This increase is documented in **Exhibit 44.**

Exhibit 42

Multiple State Urbanized Areas
1994

Urbanized Areas	UZAs	50,000 to 199,999	200,000 to 1 Million	Over 1 Million
Within One State	352	252	74	26
Within Two States	46	24	15	7
Within Three States	6	4	1	1
Within Four States	1		1	-
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	PT	42	0	0	0	116	2
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200,000 to 1 Million Population	DO	45	0	0	2	45	10
	PT	29	0	1	0	72	5
Total		74	0	1	2	117	15
Over 1 Million Population	DO	94	14	9	16	50	21
	PT	53	0	9	0	23	9
Total		147	14	18	16	73	30
Directly Operated	DO	354	14	9	19	198	39
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Chapter 4
Capital Funding

Introduction

Capital investment in transit declined in 1994, reversing a trend of increase that has been observed during the last 5 years. Total dollars invested in the transit industry in 1994 dropped by over 2.3 percent in relation to 1993.

Chapter Organization

This chapter begins with a review of the sources of capital funding. It then discusses the uses of capital funds by mode and by category of use. Finally, information on uses of capital funds for individual systems is presented for each mode.

Sources of Capital Funds

Federal capital assistance continues to be the single largest source of funds for capital investment in transit infrastructure. Of the over $5.5 billion used in 1994 for capital investment in transit infrastructure expansion and rehabilitation, Federal assistance accounted for nearly45 percent. Local funds represented 37 percent and State funding contributed 18 percent of the capital assistance provided. The sources and amounts of capital funding for the 1990-1994 timeframe are given **in Exhibit** 48. The reduction in capital funding observed in 1994 correlates to the sharp decline in State capital dollars, which suffered a reduction of 23.6 percent from 1993 to 1994. It should be noted, however, that in 1993 the contribution of State funds increased by 69 percent in relation to 1992, representing 23 percent of total capital investment in 1993. Previously, between 1990 and 1993, the share of State assistance displayed a stable behavior, ranging between 12 and 15 percent of the total capital investment. The share of State funds in 1994 accounted for 18 percent of the capital invested and is therefore higher than the average share for the years preceding 1993. This is an indication that despite the fact that Federal assistance increased and State assistance dropped sharply in 1994, the share of Federal dollars in the transit industry is declining while the share of local and State dollars is increasing. Federal assistance increased by 5.6 percent in 1994, while local assistance remained stable, with a slight increase of 2 percent.

Distribution of Capital Funds by UZA Size and Source.

Urbanized areas (UZAs) with a population of more than 1 million inhabitants account for nearly $5.2 billion, or over 92 percent, of the capital investment made in the transit infrastructure in 1994. This is due to the substantial fixed guideway systems in place or being developed in the nation's large metropolitan areas. These systems also require large fleets of vehicles to accommodate the needs of passengers, to maintain significant capital assets, as well as to provide sophisticated signaling and control systems and maintenance facilities.

Exhibit 48

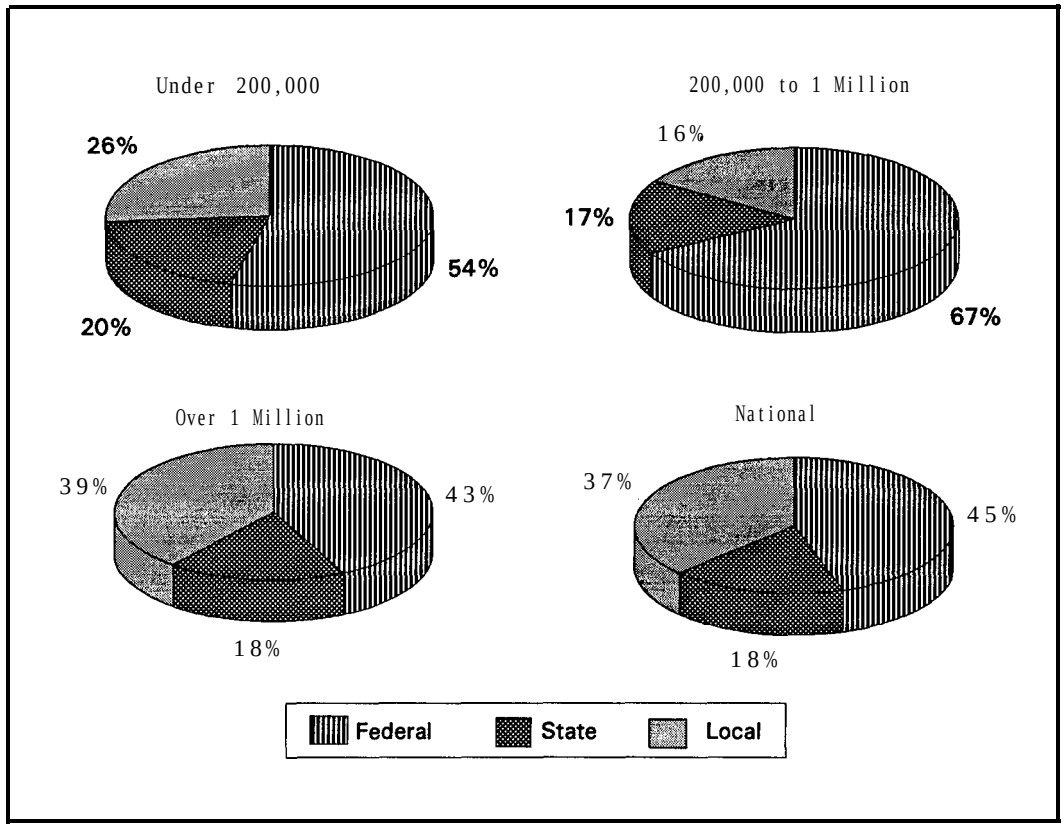
Sources of Capital Funds
(Millions)
1990-1994

	1990	1991	1992	1993	1994
Federal	$2,636.3	$2,545.0	$2,598.7	$2,383.5	$2,518.1
State	644.6	638.1	777.7	1,316.7	1,005.5
Local	1,254.6	1,914.2	1,906.2	2,033.4	2,074.8
Total	$4,535.5	$5,097.3	$5,282.6	$5,733.6	$5,598.4

As presented in Exhibit 49, large UZAs rely more heavily than mid-size and small UZAs on local finding sources to meet capital needs. Because of the substantial investment needed to maintain their transit infrastructures, large UZAs must commit more capital funds from local resources than mid-size and small UZAs, which have far less transit infrastructure.

Exhibit 49

Uses of Capital Funds by UZA Size and Source
1994



Uses of Capital Funds

Uses of capital funds are identified by mode and category of use in Exhibit 50. The categories of use are rolling stock, facilities and other capital expenditures. The remaining categories, facilities and other capital, are everything not related to rolling stock.

Exhibit 48

Sources of Capital Funds
(Millions)
1990-1994

	1990	1991	1992	1993	1994
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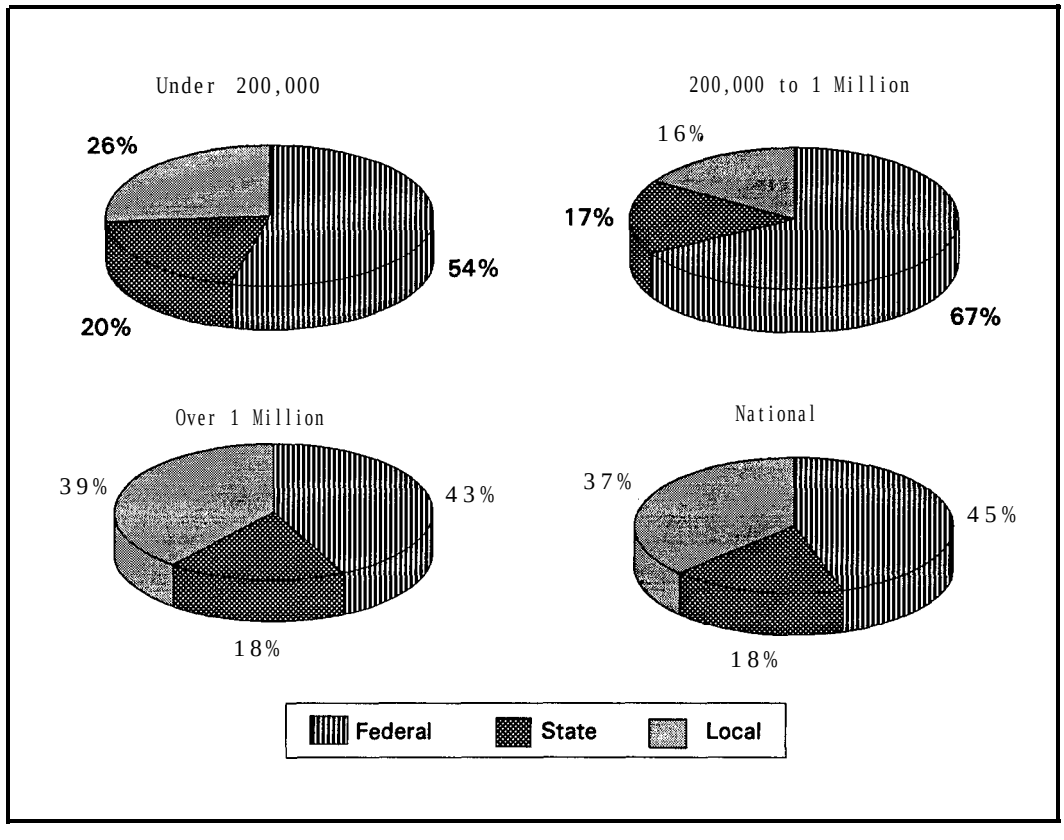
Uses of Capital Funds by UZA Size and Source
1994



Uses of Capital Funds

Uses of capital funds are identified by mode and category of use in Exhibit 50. The categories of use are rolling stock, facilities and other capital expenditures. The remaining categories, facilities and other capital, are everything not related to rolling stock.

systems operate in large, mid-size and small UZAs, and the total capital expenditure for bus is distributed among several transit agencies across the nation. Mid-size and small UZAs contribute 22 percent of the uses of capital funding for bus. The share of rolling stock in these areas is even higher than the share for large urbanized areas. This fact contributes to the overall larger share of rolling stock for bus. Demand response displays an even higher percentage of capital expenditures for rolling stock, because capital items, such as inter-modal terminals and shelters, have some relevance for bus systems, especially in large UZAs, but not for demand response systems.

Exhibit 51 lists the 20 largest users of capital funds and reflects the substantial investment in facilities and other capital expenditures for rail modes. These 20 transit agencies accounted for 72 percent of all capital spending in 1994.

Exhibit 51

Twenty Largest Users of Capital Funds
(Thousands)
1994

ST	Agency Name	Rolling Stock (000s)	Facilities and Other (000s)	Total (000s)
CA	LA-LACMTA	$8,446.5	$84,006.9	$92,453.4
CA	LA-SCRRA	8,367.4	177,496.9	$185,864.3
CA	San Francisco-BART	24,232.5	348,372.9	$372,605.4
CA	SF-CALTRANS	47,764.8	61,417.2	$1C 9,182.0
co	Denver-RTD	23,902.4	69,203.1	$93,105.5
DC	Washington-WMATA	79,037.5	199,175.0	$278,212.5
GA	Atlanta-MARTA	4,131.3	81,118.4	$85,249.7
IL	Chicago-RTA-CTA	35,413.0	198,495.0	$233,908.0
IL	Chicago-RTA-Metra	65,548.6	151,692.7	$217,241.3
MA	Boston-MBTA	37,969.4	240,670.0	$ 2 7'8,639.4
MD	Baltimore-Maryland-MTA	15,848.3	78,386.6	$94,234.9
NJ	New Jersey Transit	123,113.3	173,839.2	8296,952.5
NY	NY-MTA-Long Island RR	5,498.9	195,121.5	$200,620.4
NY	NY-MTA-Metro North RR	16,955.6	127,837.8	$144,793.4
NY	NY-MTA-NYCTA	54,632.4	836,629.7	$891,262.1
OR	Portland-Tri-Met	14,441.5	107,842.8	$122,284.3
PA	Philadelphia-SEPTA	55,777.9	180,915.5	8236,693.4
TX	Dallas-DART	18,922.0	206,112.0	$225,034.0
TX	Houston-Metro	33,571.9	77,063.9	$110,635.8
WA	Seattle-Washington	50,285.9	32,849.6	$83,135.5
	Total	$673,575.2	$3,355,611.0	$4,029,186.2

Exhibits 52 **through** 58 provide capital investment information for individual transit modes by category of use except for demand response. The 15 largest bus systems given in **Exhibit** 52 reflect a significant investment of their capital funds in facilities and other expenditures, accounting for nearly 5 1 percent of the total national capital investment for this capital expenditure category.

systems operate in large, mid-size and small UZAs, and the total capital expenditure for bus is distributed among several transit agencies across the nation. Mid-size and small UZAs contribute 22 percent of the uses of capital funding for bus. The share of rolling stock in these areas is even higher than the share for large urbanized areas. This fact contributes to the overall larger share of rolling stock for bus. Demand response displays an even higher percentage of capital expenditures for rolling stock, because capital items, such as inter-modal terminals and shelters, have some relevance for bus systems, especially in large UZAs, but not for demand response systems.

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Twenty Largest Users of Capital Funds
(Thousands)
1994

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CA	LA-LACMTA	$8,446.5	$84,006.9	$92,453.4
CA	LA-SCRRA	8,367.4	177,496.9	$185,864.3
CA	San Francisco-BART	24,232.5	348,372.9	$372,605.4
CA	SF-CALTRANS	47,764.8	61,417.2	$109,182.0
CO	Denver-RTD	23,902.4	69,203.1	$93,105.5
DC	Washington-WMATA	79,037.5	199,175.0	$278,212.5
GA	Atlanta-MARTA	4,131.3	81,118.4	$85,249.7
IL	Chicago-RTA-CTA	35,413.0	198,495.0	$233,908.0
IL	Chicago-RTA-Metra	65,548.6	151,692.7	$217,241.3
MA	Boston-MBTA	37,969.4	240,670.0	$278,639.4
MD	Baltimore-Maryland-MTA	15,848.3	78,386.6	$94,234.9
NJ	New Jersey Transit	123,113.3	173,839.2	$296,952.5
NY	NY-MTA-Long Island RR	5,498.9	195,121.5	$200,620.4
NY	NY-MTA-Metro North RR	16,955.6	127,837.8	$144,793.4
NY	NY-MTA-NYCTA	54,632.4	836,629.7	$891,262.1
OR	Portland-Tri-Met	14,441.5	107,842.8	$122,284.3
PA	Philadelphia-SEPTA	55,777.9	180,915.5	$236,693.4
TX	Dallas-DART	18,922.0	206,112.0	$225,034.0
TX	Houston-Metro	33,571.9	77,063.9	$110,635.8
WA	Seattle-Washington	50,285.9	32,849.6	$83,135.5
	Total	$673,575.2	$3,355,611.0	$4,029,186.2

Exhibits 52 **through** 58 provide capital investment information for individual transit modes by category of use except for demand response. The 15 largest bus systems given in **Exhibit** 52 reflect a significant investment of their capital funds in facilities and other expenditures, accounting for nearly 5 1 percent of the total national capital investment for this capital expenditure category.

Uses of capital funds for commuter rail are presented in **Exhibit 54.** It shows the significant share of agencies such as Chicago Metra, New Jersey Transit, and Long Island Rail Road in the total capital expenditures for commuter rail. These three agencies expended 45.8 percent of the total capital expenditures for commuter rail in 1994. **Philadelphia-**Penn Department of Transportation was the only commuter rail agency without capital expenditures in 1994.

Exhibit 54

Uses of Commuter Rail Capital Funds by Transit Agencies
(Thousands)
1994

ST	Agency Name	Rolling Stock (000s)	Facilities and Other (000s)	Total (000s)
CA	LA-SCRRA	$8,367.4	$177,496.9	$185,864.3
CA	SF-CALTRANS	0.0	2,537.1	$2,537.1
CA	San Diego-NCTD	16,105.1	21 ,518.3	$37,623.4
CA	San Jose-SCCTD	0.0	17,016.6	$17,016.6
CT	Hartford-Conn DOT	1,500.0	60,027.0	$61,527.0
FL	Ft. Lauderdale-TCRA	162.7	7,408.6	$7,571.3
IL	Chicago-RTA-Metra	65,548.6	151,692.7	$217,241.3
IN	NW IN-NICTD	143.3	5,487.5	$5,630.8
MA	Boston-MBTA	3,173.5	' 61,512.6	$164,686.1
MD	Baltimore-Maryland-MTA	11,679.8	7,128.5	$18,808.3
NJ	New Jersey Transit	81 ,334.a	135,512.1	$216,846.8
NY	NY-MTA-Long Island RR	5,498.9	195,121.5	$200,620.4
NY	NY-MTA-Metro North RR	16,955.6	127,837.8	$144,793.4
?A	Philadelphia-SEPTA	15,901.5	77,251.4	$93,152.9
TX	Dallas-DART	0.0	3,629.7	$3,629.7
TX	Houston-Metro	0.0	701.9	$701.9
VA	VA-VRE	226.5	7,937.6	$8,164.2
	Total	$226,597.8	$1,159,817.6	$1,386,415.4

Uses of capital funds for light rail are presented in **Exhibit** 55. Dallas and Portland were the agencies with the greatest capital expenditures for light rail in 1994. These two agencies together accounted for 58.8 percent of all capital expenditures, as Dallas is building **a** system and Portland is building a major expansion.

Uses of capital funds for trolleybus are presented **in Exhibit** 56. San Francisco-Muni was the agency with the greatest share of capital expenditures among **trolleybus** agencies, with 60.6 percent. Philadelphia SEPTA was the only trolleybus operator that did not have any capital expenditure for this mode in 1994.

Uses of Light Rail Capital Funds by Transit Agencies
(Thousands)
1994

Exhibit 55

ST	Agency Name	Rolling Stock (000s)	Facilities and Other (000s)	Total (000s)
CA	LA-LACMTA/SCRTD	$0.0	$1,547.3	$1,547.3
CA	Sacramento-RT	0.0	9,125.8	$9,125.8
CA	San Francisco-Muni	17,020.8	55,974.5	$72,995.3
CA	San Jose-SCCTD	0.0	30,081.3	$30,081.3
CO	Denver-RTD	978.4	34,264.7	$35,243.1
LA	New Orleans-RTA	3,618.4	0.0	$3,618.4
MA	Boston-MBTA	381.2	4,360.4	$4,741.6
MD	Baltimore-Maryland-MTA	3,264.2	5,558.6	$8,822.8
MO	St. Louis-Bi-State	1,686.4	16,067.1	$17,753.5
NC	Charlotte-CTS	0.0	189.1	$189.1
NJ	New Jersey Transit	469.5	361.9	$831.4
NY	Buffalo-NFTA	0.0	37.9	$37.9
OH	Cincinnati-SORTA	0.0	3,302.3	$3,302.3
OH	Cleveland-RTA	0.0	1,684.8	$1,684.8
OR	Portland-Tri-Met	10,855.4	97,872.6	$108,728.0
PA	Philadelphia-SEPTA	5,132.1	661.9	$5,794.0
PA	Pittsburgh-PAT	54.2	9,442.4	$9,496.6
TN	Memphis-MATA	330.0	701.9	$1,031.9
TX	Austin-Capital Metro	0.0	11.8	$11.8
TX	Dallas-DART	12,639.6	185,690.9	$198,330.5
UT	Salt Lake City-UTA	0.0	882.0	$882.0
WA	Seattle-Metro	0.0	8,029.8	$8,029.8
	Total	$56,430.1	$465,849.2	$522,279.3

Uses of Trolleybus Capital Funds by Transit Agencies
(Thousands)
1994

Exhibit 56

ST	Agency Name	Rolling Stock (000s)	Facilities and Other (000s)	Total (000s)
CA	San Francisco-Muni	$29,857.2	WQ56.8	$34,813.9
MA	Boston-MBTA	0.0	16,112.0	$16,112.0
OH	Dayton-RTA	977.4	1,555.4	$2,532.8
PA	Philadelphia-SEPTA	0.0	0.0	$0.0
WA	Seattle-Metro	375.6	3,564.2	$3,939.8
	Total	$31,210.2	$26,188.4	$57,398.6

Uses of Light Rail Capital Funds by Transit Agencies
(Thousands)
1994

Exhibit 55

ST	Agency Name	Rolling Stock (000s)	Facilities and Other (000s)	Total (000s)
CA	LA-LACMTA/SCRTD	$0.0	$1,547.3	$1,547.3
CA	Sacramento-RT	0.0	9,125.8	$9,125.8
CA	San Francisco-Muni	17,020.8	55,974.5	$72,995.3
CA	San Jose-SCCTD	0.0	30,081.3	$30,081.3
co	Denver-RTD	978.4	34,264.7	$35,243.1
LA	New Orleans-RTA	3,618.4	0.0	$3,618.4
MA	Boston-MBTA	381.2	4,360.4	$4,741.6
MD	Baltimore-Maryland-MTA	3,264.2	5,558.6	$8,822.8
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NY	Buffalo-NFTA	0.0	37.9	$37.9
OH	Cincinnati-SORTA	0.0	3,302.3	$3,302.3
OH	Cleveland-RTA	0.0	1,684.8	$1,684.8
OR	Portland-Tri-Met	10,855.4	97,872.6	$108,728.0
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UT	Salt Lake City-UTA	0.0	882.0	$882.0
WA	Seattle-Metro	0.0	8,029.8	$8,029.8
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Uses of Trolleybus Capital Funds by Transit Agencies
(Thousands)
1994

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ST	Agency Name	Rolling Stock (000s)	Facilities and Other (000s)	Total (000s)
CA	San Francisco-Muni	$29,857.2	WQ56.8	$34,813.9
MA	Boston-MBTA	0.0	16,112.0	$16,112.0
OH	Dayton-RTA	977.4	1,555.4	$2,532.8
PA	Philadelphia-SEPTA	0.0	0	$0.0
WA	Seattle-Metro	375.6	3.564.2	$3,939.8
	Total	$31,210.2	$26,188.4	$57,398.6

Uses of Light Rail Capital Funds by Transit Agencies
(Thousands)
1994

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Uses of Trolleybus Capital Funds by Transit Agencies
(Thousands)
1994

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PA	Philadelphia-SEPTA	0.0	0	$0.0
WA	Seattle-Metro	375.6	3.564.2	$3,939.8
	Total	$31,210.2	$26,188.4	$57,398.6

miles. One reason for the growth in bus fixed guideway segments is the inclusion of high occupancy vehicle lanes in urban freeway designs and construction. Also, some fixed guideway applications, such as controlled access rights-of-way, can be implemented with minimal capital investment.

Vehicle Availability

The number of vehicles available for maximum service by mode and by type of service is reflected **in Exbibit 61.** In addition, the number of vehicles that meet the Americans with Disabilities Act (ADA) regulations is included. Heavy rail is the mode with the highest percentage of ADA accessible vehicles, with 78.6 percent of vehicles in that category. Demand response directly operated is the mode with the second highest percentage of ADA accessible vehicles, with 75.3 percent, while only 45.3 percent of demand response purchased transportation vehicles are ADA accessible. This is due mainly to the large number of taxicabs being used for demand response service. There is a strong

Exbibit 61

Vehicles Available for Maximum Service and ADA Accessible by Mode and Type of Service 1994

Modes/Type of Service	Vehicles	ADA Accessible Vehicles	Percent Available
Buses			
Directly Operated	49,745	26,349	53.0%
Purchased Transportation*	3,975	2,280	57.3%
Total	53,720	28,629	53.3%
Heavy Rail			
Directly Operated	10,282	8,086	78.6%
Purchased Transportation *	0	0	0.0%
Total	10,282	8,086	78.6%
Commuter Rail			
Directly Operated	4,454	695	15.6%
Purchased Transportation *	672	248	36.9%
Total	5,126	943	18.4%
Light Rail			
Directly Operated	1,031	375	36.4%
Purchased Transportation *	0	0	0.0%
Total	1,031	375	36.4%
Demand Response			
Directly Operated	3,716	2,800	75.3%
Purchased Transportation *	13,731	6,214	45.3%
Total	17,447	9,014	51.7%
Other			
Directly Operated	2,388	361	15.1%
Purchased Transportation *	2,442	37	1.5%
Total	4,830	398	8.2%

*** Purchased transportation data are partial because directly operated includes some purchased transportation data. Refer to Exhibit 5 in the Introduction.**

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Non-Fixed Guideway Vehicles

Non-fixed guideway vehicles by vehicle type, by mode, and by type of service are presented in Exhibit 64. Over 88 percent of vehicles operated in bus service are high capacity coaches, seating more than 35 passengers. In contrast, nearly 40 percent of demand response vehicles are vans, while over 39 percent are automobiles.

Exhibit 64

Non-Fixed Guideway Vehicles by Vehicle Type, Mode, and Type of Service 1994

Vehicle Type	Bus		Demand Response	
	Directly Operated	Purchased Transportation	Directly Operated	Purchased Transportation
Class A Bus (>35 Seats)	46,162	2,866	37	24
Class B Bus (25-35 Seats)	3,202	480	113	43
Class C Bus (<25 Seats)	999	548	1,731	1,731
Articulated Bus	1,626	48	15	0
School Bus	95	13	16	67
Van	83	103	1,799	5,450
Automobile	0	3	134	6,993
Total	52,167	4,061	3,845	14,308

Non-fixed guideway vehicles by vehicle type and by propulsion are demonstrated in Exhibit 65. The exhibit shows that, while other forms of propulsion are growing in acceptance, diesel fuel-powered vehicles and gasoline-powered vehicles continue to account for 78.9 percent and 18.4 percent, respectively, for all non-fixed guideway vehicles. Other means of propulsion, including electricity, liquefied natural gas, compressed natural gas, and liquefied petroleum gas, account for the remaining 3.2 percent.

Exhibit 65

Non-Fixed Guideway Vehicles by Vehicle Type and Propulsion 1994

Vehicle Type	Diesel Fuel	Gasoline	Other Fuels	Total
Class A Bus (> 35 Seats)	47,769	21	1,295	49,085
Class B Bus (25-35 Seats)	3,645	70	123	3,838
Class C Bus (<25 Seats)	3,183	1,342	414	4,,933
Articulated Bus	1,635	0	54	1,,683
School Bus	168	23	0	191
Van	1,814	5,188	430	7,,432
Automobile	24	6,919	71	7,014
Total	58,238	13,563	2,387	74,188

New Vehicles Acquired

A summary of new vehicles acquired by mode and by type of service for 1994 is presented in Exhibit 66. Data for 1994 in this exhibit reflect only the number of new vehicles acquired within the report year. Since a transit agency's report year is based on its fiscal year, data for 1994 are limited to that portion of the manufacturer year included within the transit agency's fiscal year. For example, a transit agency with a fiscal year ending on June 30 will report only the new vehicles accepted and placed into service at the end of June 30. As a result, a vehicle manufactured in a given year, but accepted after the transit agency's fiscal year ends, will not be reported until the subsequent report year for that

Non-Fixed Guideway Vehicles

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Exhibit 65

Non-Fixed Guideway Vehicles by Vehicle Type and Propulsion 1994

Vehicle Type	Diesel Fuel	Gasoline	Other Fuels	Total
Class A Bus (> 35 Seats)	47,769	21	1,295	49,085
Class B Bus (25-35 Seats)	3,645	70	123	3,838
Class C Bus (<25 Seats)	3,183	1,342	414	4,,933
Articulated Bus	1,635	0	54	1,683
School Bus	168	23	0	191
Van	1,814	5,188	430	7,432
Automobile	24	6,919	71	7,014
Total	58,238	13,563	2,387	74,188

New Vehicles Acquired

A summary of new vehicles acquired by mode and by type of service for 1994 is presented in Exhibit 66. Data for 1994 in this exhibit reflect only the number of new vehicles acquired within the report year. Since a transit agency's report year is based on its fiscal year, data for 1994 are limited to that portion of the manufacturer year included within the transit agency's fiscal year. For example, a transit agency with a fiscal year ending on June 30 will report only the new vehicles accepted and placed into service at the end of June 30. As a result, a vehicle manufactured in a given year, but accepted after the transit agency's fiscal year ends, will not be reported until the subsequent report year for that

Another perspective on fleet age is provided in Exhibit 67. Comparisons with Exhibit 66 should be avoided because Exhibit 67 provides data by fleet type, while Exhibit 66 provides information by mode. Each of the vehicle types enjoys a different useful life greatly influenced by use, weather, road conditions, maintenance practices, and local policies regarding rehabilitation and overhaul. Thus, the decline in average age is reflected in the number of standard buses, small buses, and vans that are 5 years of age or less, while the longer useful lives of heavy rail, commuter rail, and light rail vehicles are reflected by the large number of vehicles that are more than 15 years old.

Exhibit 67

***Vehicles** by Age and **Vehicle** Type*
***Directly Operated** Service*
1994

Vehicle Type	Age in Years						Total
	5 Years or Less	6-11 Years	12-15 Years	16-20 Years	21-25 Years	Over 25 Years	
Buses							
Class A Bus (>35 Seats)	13,982	17,258	9,245	2,428	724	500	44,137
Class B Bus (25-35 Seats)	1,549	933	553	129	36	1	3,201
Class C Bus (<25 Seats)	1,890	682	46	8		-	2,626
Articulated Bus	221	740	473	131		-	1,565
School Bus	102	6	1	2		-	111
Heavy Rail	514	3,115	714	1,416	1,192	3,202	10,153
Commuter Rail	404	800	217	782	1,527	919	4,649
Light Rail	139	301	212	218	2	97	969
Van/Auto	3,073	444	8	1	-	-	3,526
Total	21,874	24,279	11,469	5,115	3,481	4,719	70,937

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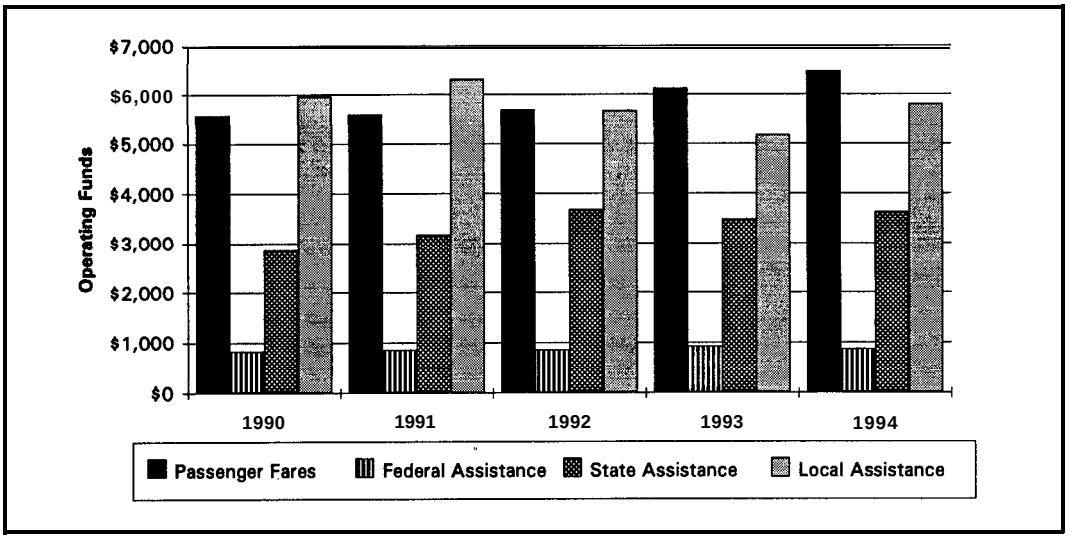
Exhibit 68

Sources of Operating Funds (Millions) 1990-1994



Operating funds applied increased 3.5 percent in 1994 compared with 1993. The contribution of passenger fares, and State and local assistance increased in 1994, while Federal assistance decreased by 5.6 percent.

For the 1990- 1994 timeframe, passenger fares as a percentage of operating funds applied remained very stable, ranging from 36.7 percent in 1990 to 37.3 percent in 1994. The contribution of local assistance also remained very stable, ranging from 33.3 percent in 1990 to 33.5 percent in 1994. It should be noted, however, that in 1994, local assistance included some sources of funding that were accounted as "other" funds in previous years. These sources of funds applied are revenues accrued through a purchased transportation agreement and subsidies from other sectors of the operation which were considered as "other" funds from 1990 to 1993. These two sources represent 3.1 percent of the total operating funds in 1994. Federal assistance accounted for 18.8 percent of the total operating funds in 1990 and decreased to 4.9 percent in 1994. State assistance, on the other hand, increased from 18.8 percent in 1990 to 20.9 percent in 1994.

Sources of Operating Funds Applied by UZA Size

The distribution of transit operating funds applied from the various sources available by size of urbanized area is outlined in Exhibit 69. While the trend in transit operating funds applied has been a decreased role for Federal funding and an increased role from other sources, there is a variation among the different sizes of urbanized areas. For small urbanized areas, Federal funding decreased from 2 1.1 percent in 1990 to 19.1 percent in 1994. For mid-size urbanized areas, the decline in the share of Federal funding was higher, from 14 percent in 1990 to 10.9 percent in 1994, totalling a 3.1 percent decrease. This decline was compensated for by increases in State and local assistance which increased 3.2 and 4.6 percent, respectively, for the 1990-1994 timeframe. State and local assistance also increased for small urbanized areas from 1990 to 1994, but at a slower rate. State and local assistance grew by 1.8 percent and .2 percent, respectively, for small urbanized areas between 1990 and 1994.

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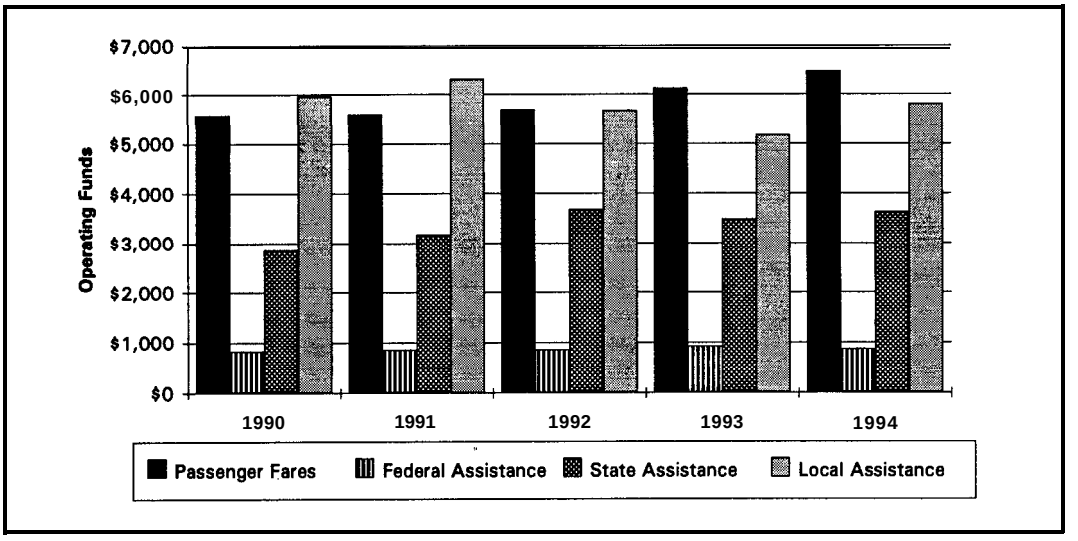
Sources of Operating Funds (Millions) 1990-1994



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Total operating expenses increased 10.9 percent from 1990 to 1994, as shown **in Exhibit** 70. The consumer price index increased 13.2 percent for this period, indicating that total operating expense for public transit has been maintained below inflation.

Exhibit 70

Operating Expense by Mode and Reconciling Cash Expenditures
(Millions)
1990-1994

Mode	1990	1991	1992	1993	1994	Difference 1990-1994
Bus	$7,789	$8,330	$8,625	$8,514	$8,860	13.7%
Heavy Rail	3,825	3,841	3,555	3,669	3,786	(1.0)
Commuter Rail	2,157	2,175	2,170	2,080	2,228	3.3
Light Rail	236	290	307	314	412	74.4
Demand Response	386	443	500	540	634	64.2
Other	323	325	342	356	401	24.1
Operating Expenses	$14,716	$15,404	$15,499	$15,473	$16,320	10.9%
Reconciling Cash Expenditures	$726	$908	$1,064	$914	$961	32.4%

It should be noted that operating expense reported by agencies was not fully allocated by **function** and object class in 1990 and 199**1**. Joint expenses were reported separately for agencies operating more than one mode in 1990 and 199 1, although multi-modal agencies were encouraged to allocate joint expenses by function and object class to each mode to the maximum possible extent. Starting in 1992, **full** allocation of joint expenses by mode, **function,** and object class became mandatory. Therefore, reported operating expense by mode from 1992 on reflects more accurately the real costs of transit modes in the United States because joint expenses are fully allocated.

Upon examination of total operating expenses by mode, demand response and light rail experienced the highest increases for the **1990-** 1994 timeframe. Operating expenses for demand response and light rail increased by over 62 and 74 percent, respectively. These increases reflect expansion of the service supplied by these modes and implementation of new light rail systems across the nation. Commuter rail experienced a small increase in operating expenses. Heavy rail is the only mode with a decrease for the 1990-1994 timeframe. The increase for bus was 13.7 percent and reflects the moderate increase in service supplied for this mode in the last 5 years.

The contribution of each mode to total operating expense in 1994 is displayed **in Exhibit 71,** which reflects the dominance of bus services, which accounted for 54 percent of the 1994 total operating expenses. Heavy rail consumed over 23 percent and commuter rail represents over 13 percent. Demand response and light rail, while increasing in the amount of service supplied and in operating expense, represent less than 4 percent and slightly over 2 percent, respectively, of total operating expenses for 1994.

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As noted in the Introduction, purchased transportation data not reported as directly operated include a subset of the data that constitutes the NTD. These data are reported under object class "purchased transportation in report" and coded as 508.1. While all expenses for directly operated service are allocated by object class and function, expenses for purchased transportation included in the buyer's report, or 508.1, include only the total cost for the buyer for the purchased services. This expense is not allocated by function. It is a lump sum that reflects the total cost for the buyer. The 1994 *Reporting Manual* instructs agencies to report this lump expense under vehicle operations and/or general administration. The majority of agencies report these data under vehicle operations or general administration as the 1994 *Reporting Manual* suggests, but a few agencies allocate "purchased transportation in report" expenses under vehicle maintenance and non-vehicle maintenance. Therefore, the resulting distribution of "purchased transportation in report" expenses across functions does not reflect the real weight of each function in the total expense: Thus, only the directly operated component of the total operating expense can provide an accurate picture of the relative weight of each function. The 1994 NTD cannot provide the real distribution of expenses across functions for the whole aggregated data. The reason for this limitation is related to the way purchased transportation is reported, as explained in the Introduction and in this chapter.

The allocation of operating expense by function and object class is displayed in Exhibit 74. The bottom line in the exhibit displays the total expense for each function for directly operated service which reflects the total expense for each function exclusive of object class "purchased transportation in report." Direct labor and fringe benefits represent a substantial amount of the expenses for vehicle operations and maintenance expenses. Over 86 percent of the total cost allocated to vehicle operations is expended with labor and fringe benefits, while the rates for vehicle maintenance and non-vehicle maintenance are 74.4 and 87.3 percent, respectively. The share of labor and fringe benefits for general administration is 60 percent, which is smaller than the rates for vehicle maintenance and non-vehicle maintenance, but still more than all other object classes together, demonstrating the sensitivity of the transit industry to labor-related issues.

General administration reflects much greater proportions of costs attributed to the services and "other" object classes than is found with the other functions. This is not unusual given that the level of services needed to support such administrative activities as legal services, finance and accounting, purchasing and stores, planning, marketing, and engineering is far greater than the level of services needed to support operations and maintenance functions.

Other expenses, such as casualty and liability costs, taxes, interest payments, depreciation, and leases and rentals, are also attributed to administrative activities. Thus, 30.3 percent of general administration expense is accounted for by services and other items; whereas these object classes account for very little of operations and maintenance expense.

Negative amounts appear in the "other" object classes for the maintenance functions due to expense transfers created by the adjustment and reclassification of previously recorded expenses to other functions. Also, expense transfers that resulted when non-operating costs temporarily credited to functions were ultimately capitalized are also incorporated into the other object class for purposes of this publication. The vehicle and non-vehicle maintenance functions are more capital-intensive and thus more likely to experience capitalization of non-operating costs resulting in expense transfers.

Operating Expense by Function and Mode for Directly Operated Service

Operating expenses by function and mode are displayed in **Exhibit** 75. The exhibit includes only the directly operated component of each modal expense. As explained, the object class purchased transportation in report (508.1) is not allocated by function and, therefore, must be excluded from the allocated expenses and reported only as a lump sum in the column total. The only modes not affected are heavy rail and light rail for not having a purchased transportation component in the service supplied. Bus and demand response are the only individual modes expending more than 50 percent of the total expenses with vehicle operations. The main reason for this is due to the high unit maintenance cost (vehicle and non-vehicle maintenance) of rail modes when contrasted with bus and demand response. While the share of maintenance for bus and demand response is 26 and 15.5 percent, respectively, the share for heavy rail, commuter rail, and light rail is 39.8, 43.7, and 41.7 percent, respectively. The share of vehicle operations for bus is 56.3 percent and for demand response is 60.3 percent. Demand response is the mode with the highest percentage of expenses, with general administration with 24.3 percent.

Exhibit 75

Operating Expense by Function and Mode and Reconciling Cash Expenditures (Millions) 1994

Mode	Vehicle Operation	Vehicle Maintenance	Non-Vehicle Maintenance	General Administration	Total
Bus	$4,787.5	$1,848.6	$364.7	$1,500.1	$8,500.8
Heavy Rail	1,677.6	579.0	927.9	601.7	$3,786.2
Commuter Rail	831.7	495.6	405.3	327.0	$2,059.6
Light Rail	172.2	86.0	85.4	67.9	$411.6
Demand Response	133.0	30.6	3.6	53.5	$220.6
Other	213.1	61.3	29.3	49.0	$352.8
Total Directly Operated	$7,815.1	$3,101.0	$1,816.1	$2,599.3	$15,331.5
Purchased Transportation					$988.4
Grand Total					$16,319.9

Negative amounts appear in the "other" object classes for the maintenance functions due to expense transfers created by the adjustment and reclassification of previously recorded expenses to other functions. Also, expense transfers that resulted when non-operating costs temporarily credited to functions were ultimately capitalized are also incorporated into the other object class for purposes of this publication. The vehicle and non-vehicle maintenance functions are more capital-intensive and thus more likely to experience capitalization of non-operating costs resulting in expense transfers.

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The second way of reporting purchased transportation is the seller filing its own report and directly operating its service. In most of these cases, the seller operates more than 100 vehicles in maximum service and must file a separate report. However, in some cases, the buyer of the service is a public entity that does not report to the NTD and the seller reports on behalf of the buyer. In other cases, both buyer and seller are reporters, with the seller operating less than 100 vehicles in maximum service and, therefore, not required to make a separate report submission. In this case, the reason for the seller reporting is that in some States, the law requires that all providers of public transportation report to be eligible to receive State funds.

The fact that a component of purchased transportation data is reported by the sellers implies that directly operated and purchased transportation are not mutually exclusive categories of service. All exhibits displaying data by type of service in this chapter include all the data for the directly operated category. Purchased transportation data displayed in these exhibits include only the aggregation of the component included in the buyer's report. A full accountability of purchased transportation data can be obtained by adding the total displayed in the exhibit under consideration with the corresponding data item displayed **in Exhibit** 5 in the Introduction.

In many situations, it might be of interest to split the data between the public and private sectors, rather than split between directly operated and purchased transportation. The public sector would include all public agencies directly supplying the service consumed by the public. The private sector would include all private companies under contract to public agencies to provide public transportation. For the exhibits displaying data by type of service (directly operated and purchased transportation), the aggregation for public and private sectors can be achieved by adding the purchased transportation data item(s) included in **Exhibit** 5 to the purchased transportation data item(s) included in the exhibit under analysis. This sum will result in the total data item(s) for the private sector. The same data item(s) included in **Exhibit** 5 subtracted from the data item(s) for directly operated will result in the total data item(s) for the public sector. Refer to the Introduction for further information about limitations and restrictions on the characterization of public and private sectors in the NTD.

Chapter Organization

The chapter begins with discussions of service supplied and consumed by mode and type of service from 1990 through 1994. Performance measures are then presented to measure the effectiveness and efficiency of service supplied and consumed. Finally, indicators of service supplied and consumed as well as performance measures are provided based on urbanized area (UZA) size.

Vehicle Revenue Miles by Mode and Type of Service

Vehicle revenue miles by mode and type of service are presented **in Exhibit** 76. Transit service supplied amassed nearly 2.7 billion vehicle revenue miles in 1994. Bus is the mode with the highest percentage of vehicle revenue miles with 59 percent, followed by heavy rail with 19.2 percent and demand responsewith 10.2 percent.

Vehicle Revenue Miles by Mode and Type of Service
(Millions)
1994

Exhibit 76

Mode	Directly Operated	Purchased Transportation*	Total
Bus	1,474.1	111.8	1,585.8
Heavy Rail	516.0	0.0	516.0
Commuter Rail	191.0	18.5	209.5
Light Rail	33.3	0.0	33.3
Demand Response	80.6	192.2	272.8
Other	33.7	28.4	62.1
Total	2,328.6	350.9	2,679.5

* Purchased transportation data are partial because directly operated includes some purchased transportation data. Refer to Exhibit 5 in the Introduction.

All modes provide part of the service supplied through purchased transportation contracts with private providers with the exception of heavy rail and light rail, which are owned and operated exclusively by the public sector. The percentage of vehicle revenue miles provided by the private sector was 17.6 percent in 1994. These data are obtained by adding the total purchased transportation displayed in this exhibit and the total purchased transportation directly operated given **in Exhibit** 5. Bus accounted for 43.2 percent of all purchased transportation service supplied in 1994 and demand response 43.3 percent. Demand response is the only mode in which participation by the private sector is greater than the public sector's participation in the supply of transit service. Bus and demand response together accounted for 86.5 percent of all purchased transportation service supplied as measured by vehicle revenue miles. All percentages related to purchased transportation include the data displayed **in Exhibit 5.**

Vehicle revenue miles by mode for the 1990-1994 timeframe are displayed **in Exhibit 77.** Demand response and light rail are the modes with the largest increases in service supplied for the 1990-1994 timeframe. Annual vehicle revenue miles for demand response rose 59.3 percent between 1990 and 1994. Light rail service increased 45.2 percent during the same **timeframe**. Commuter rail and bus experienced less substantial growth, with 8.6 percent and 3.3 percent, respectively. Heavy rail is the only mode to show a loss during this time period with a **decline** of 0.9 percent.

Vehicle Revenue Miles by Mode
(Millions)
1990-1994

Exhibit 77

Mode	1990	1991	1992	1993	1994
Bus	1,534.5	1,552.4	1,555.9	1,578.3	1,585.8
Heavy Rail	520.8	508.3	509.7	505.2	516.0
Commuter Rail	193.0	197.9	199.9	203.4	209.5
Light Rail	22.9	26.6	27.8	26.9	33.3
Demand Response	171.2	185.8	208.5	243.4	272.8
Other	24.2	27.8	32.2	35.9	62.1
Total	2,466.6	2,498.8	2,534.0	2,593.1	2,679.5

Vehicle Revenue Miles by Mode and Type of Service **Exhibit 76**
(Millions)
1994

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Other	24.2	27.8	32.2	35.9	62.1
Total	2,466.6	2,498.8	2,534.0	2,593.1	2,679.5

Service Supplied: Modal Comparison

Exhibit 82 compares the modal shares of each of the service supplied measures examined in this chapter. Evident is the dominance of bus service, accounting for 59.2, 68.2, and 59.3 percent of vehicle revenue miles, revenue hours, and number of vehicles operated in maximum service, respectively. Bus and demand response have a larger share of vehicle revenue hours when compared with vehicle revenue miles. Also, the data indicate that bus is not as fast as demand response. Bus systems operate on fixed routes with fixed stops and incur dwell time in traffic. Both represent important components of the travelling time for bus. Service supplied data for demand response reveal the low capacity nature of this mode when contrasted with bus and rail modes. Demand response shares 17.4 percent of total vehicles operated in maximum service, but its share of vehicle revenue miles and hours is slightly more than 10 percent.

Exhibit 82

Modal Comparison of Service Supplied 1994

Mode	Percentage of Vehicle Revenue Miles	Percentage of Vehicle Revenue Hours	Percentage of Vehicles in Maximum Service
Bus	59.2%	68.2%	59.4%
Heavy Rail	19.3	13.9	11.3
Commuter Rail	7.8	3.4	5.4
Light Rail	1.2	1.3	1.0
Demand Response	10.2	10.9	17.4
Other	2.3	2.3	5.0
Total	100%	100%	100%

Among rail modes, heavy rail, and commuter rail are fixed guideway modes that usually do not share the right-of-way with other modes or general traffic. Therefore, their shares of vehicle revenue miles are greater than their shares of vehicle revenue hours. Light rail is the mode with the smallest share of vehicle revenue miles, vehicle revenue hours, and vehicles operated in maximum service. Many light rail systems do not operate in exclusive rights-of-way and this affects their average speed.

Service Consumed: Unlinked Passenger Trips by Mode

Over 7.7 billion passenger trips were reported in 1994. As shown in Exhibit 83, bus carried 60.1 percent of the total ridership in 1994, followed by heavy rail, with 28.2 percent. All the other modes combined share the remaining 11.7 percent.

Directly operated service accounted for 96.6 percent of service consumed, as measured by unlinked passenger trips. It includes both public agencies directly operating their services and part of the private providers under contract to public agencies. When the data for private providers directly operating their services are added to the purchased transportation reported by the buyers, the share of the private sector in terms of unlinked passenger trips is 6.9 percent of the total ridership. In addition, bus is the mode with the largest share of the total service consumed made available by the private sector, with 72.5 percent of the unlinked passenger trips.

Passenger Miles by Mode

Another measure of service consumption, passenger mile, is a variable reported by agencies in the NTD. Passenger miles are available by mode and type of service and are usually determined through sampling.

As shown in **Exhibit** 85, more than 37.8 billion passenger miles were reported in 1994. Ninety-five percent of all these miles were reported in directly operated service. The directly operated service includes both public agencies directly operating their services and some of the private providers under contract to public agencies. When the data for the private providers directly operating their services are added to the purchased transportation reported by the buyers, the share of the private sector in terms of passenger miles is 11.6 percent of the total passenger miles.

Exhibit 85

Passenger Miles by Mode and Type of Service
(Millions)
1994

Mode	Directly Operated	Purchased Transportation*	Total
Bus	16,195	1,000	17,195
Heavy Rail	10,668	-	10,668
Commuter Rail	7,366	630	7,996
Light Rail	831		831
Demand Response	131	245	377
Other	567	248	815
Total	35,758	2,123	37,882

* Purchased transportation data are partial because directly operated includes some purchased transportation data. Refer to Exhibit 5 in the Introduction.

The dominance of bus is again evident when examining passenger miles by mode. Bus accounts for 45.4 percent of all passenger miles, followed by 28.2 percent for heavy rail and 21.1 percent for commuter rail. Light rail and demand response each account for 2.2 percent and 1 percent, respectively, of the total.

As seen in **Exhibit** 86, passenger miles decreased slightly (0.29 percent) in the 1990-1994 timeframe. Bus and heavy rail experienced decreases in passenger miles between 1990 and 1994. These two modes together accounted for 73.5 percent of all passenger

Exhibit 86

Passenger Miles by Mode
(Millions)
1990-1994

Mode	1990	1991	1992	1993	1994
Bus	18,070	18,104	17,494	17,364	17,195
Heavy Rail	11,475	10,488	10,737	10,231	10,668
Commuter Rail	7,083	7,383	7,320	6,912	7,996
Light Rail	570	661	700	704	831
Demand Response	259	274	317	389	377
Other	535	563	585	625	815
Total	37,992	37,473	37,153	36,225	37,882

miles in 1994. Light rail and demand response are the modes with the largest increases in passenger miles for the 1990-1994 timeframe (45.0 and 45.4 percent respectively) following the trend observed for unlinked passenger trips for these two modes.

Passenger miles increased by 4.6 percent in 1994 compared with 1993 and only demand response and bus experienced decreases in relation to 1993. The modes with the highest increases in 1994 were light rail with 18 percent and commuter rail with 15.7 percent compared with 1993.

Service Consumed: Modal Comparison

The distribution of unlinked passenger trips and passenger miles by mode is given in **Exhibit** 87 as well as the average trip length for each mode. Bus is the mode with the biggest share of service consumed with 60. I percent of all unlinked passenger trips and 45.4 percent of all passenger miles in 1994. Heavy rail displays a similar share of unlinked passenger trips and passenger miles and is the mode with the second largest share of service consumed. Commuter rail's share of passenger miles is much higher than its share of **unlinked** passenger trips; this is a result of the long trip length of this mode. Light rail and demand response account for a small share of service consumed, both in terms of ridership and passenger miles. The average trip length for all modes combined is 4.9 miles.

Exhibit 87

Distribution of Unlinked Passenger Trips and Passenger Miles With Average Trip Length by Mode
1994

Mode	Percentage of Total Unlinked Passenger Trips	Percentage of Total Passenger Miles	Average Trip Length in Miles
Bus	60.1%	45.4%	3.7
Heavy Rail	28.2	28.2	4.9
Commuter Rail	4.4	21.1	23.6
Light Rail	3.7	2.2	2.9
Demand Response	0.7	0.9	7.0
Other	2.9	2.2	3.6
Total	100.0%	100.0%	
Weighted Average			4.9

Performance Indicators

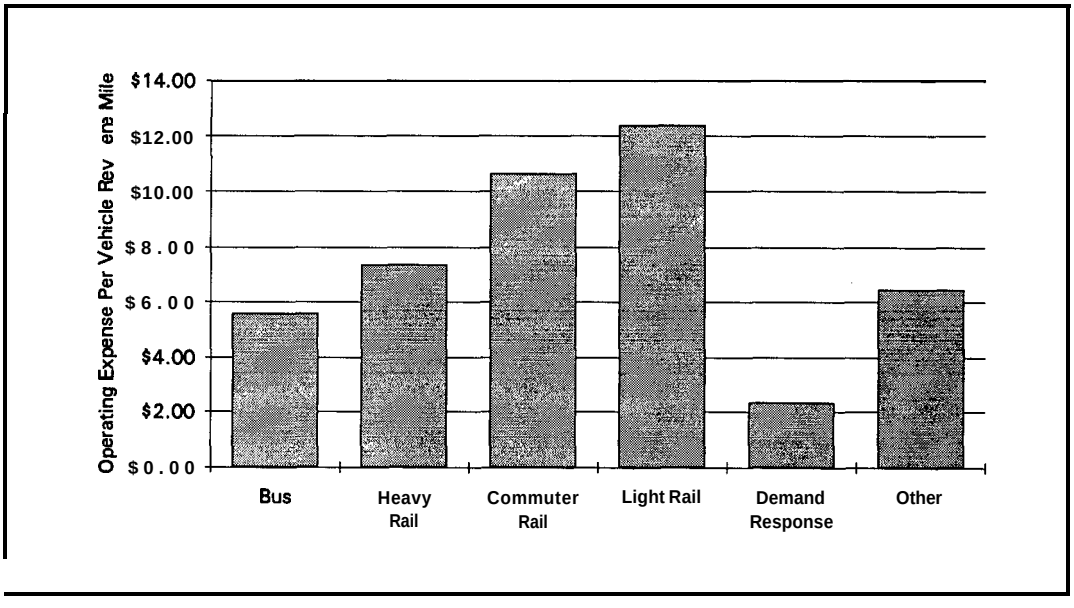
Certain **performance** indicators are used to assess the effectiveness and efficiency of **transit** service delivery. Operating expense per vehicle revenue mile is one measure of service efficiency, while operating expense per unlinked passenger trip and operating expense per passenger mile offer measures of cost effectiveness. Service effectiveness is analyzed by examining the ratio between unlinked passenger trips and vehicle revenue miles.

Service Effkiency: Operating Expense Per Vehicle Revenue Mile by Mode

Service efficiency as measured by operating expense per vehicle revenue mile is displayed in **Exhibit** 88. Demand response has the smallest cost per mile, at $2.32 per vehicle revenue mile, followed by bus, at $5.59 per vehicle revenue mile. The rail modes displayed higher operating expense per revenue mile than bus and demand response. In addition, hourly wages for rail modes are usually higher than the hourly wages for bus and demand response, and rail modes have less revenue mile per total employee hours than bus and demand response. Further, a substantial component of the cost per mile of rail modes is related to maintenance costs (both vehicle and non-vehicle maintenance), while this component is not as significant for bus and demand response. Comparing bus to demand response, the average hourly wage for bus is substantially higher (65 percent higher) than the average hourly wage for demand response. For these two modes, labor is the dominant factor in the cost of public transportation service. Another factor, although not as relevant as hourly wage, is the effect of purchased transportation in the cost per mile of demand response. Private providers generate more than 50 percent of all service supplied for demand response. These providers are usually more efficient in the production of service supplied due to the lower hourly wages and more restrictive **fringe** benefits offered to their employees.

Exhibit 88

Operating Expense Per Vehicle Revenue Mile by Mode 1994



Among rail modes, light rail and commuter rail have higher cost per mile than heavy rail. Commuter rail's high peak-to-base ratio is an important factor for its higher cost per mile. In addition, commuter rail is the mode with the highest hourly wage per vehicle hour among all modes. Comparing heavy rail to light rail, the number of revenue miles per total employee hours is substantially higher for heavy rail. Heavy rail operates in dense corridors and is designed to operate with small **headways** in exclusive rights-of-ways at high speeds. Therefore, heavy rail produces more output (both revenue miles and hours) per total hour

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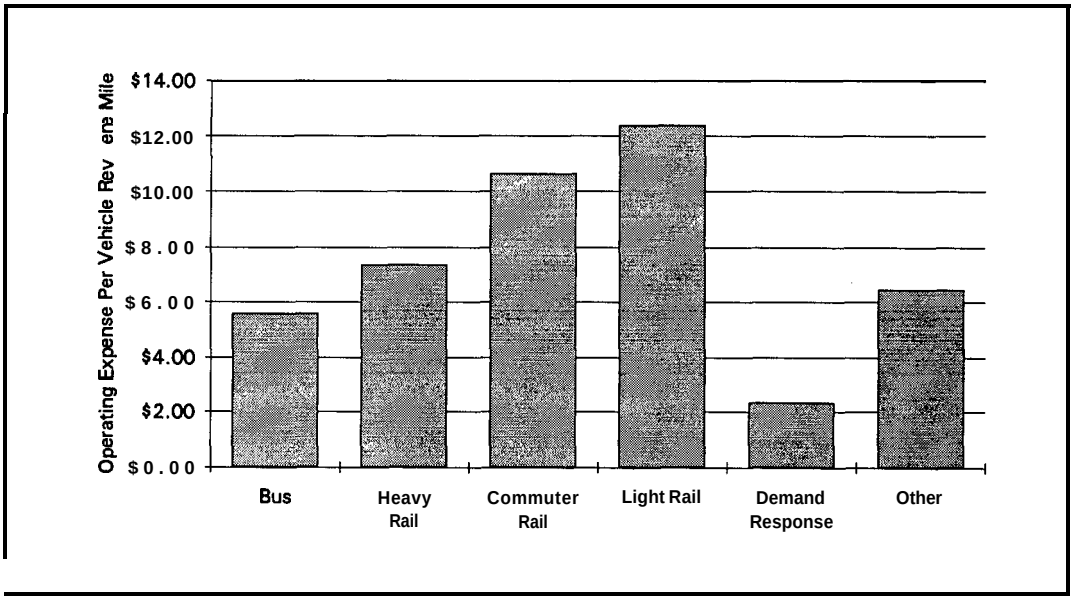

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The changes in operating expense per unlinked passenger trip by mode from 1990 to 1994 are displayed in **Exhibit 91.** Although bus, heavy rail, and light rail remain cost effective modes, their costs per trip have increased 7.3 to 22.4 percent since 1990. Commuter rail cost, though significantly higher, has also increased about 12 percent. Demand response experienced the most dramatic change in the cost per trip, with an increase of 3 7 percent. Demand response is the mode where growth in ridership always adversely affects its cost effectiveness. The decrease in the cost per unlinked passenger trip observed from 1992 to 1993 for demand response is the result of an overstated aggregation of operating expenses for that year.

Exhibit 91

Operating Expense Per Unlinked Passenger Trip by Mode 1990-1994

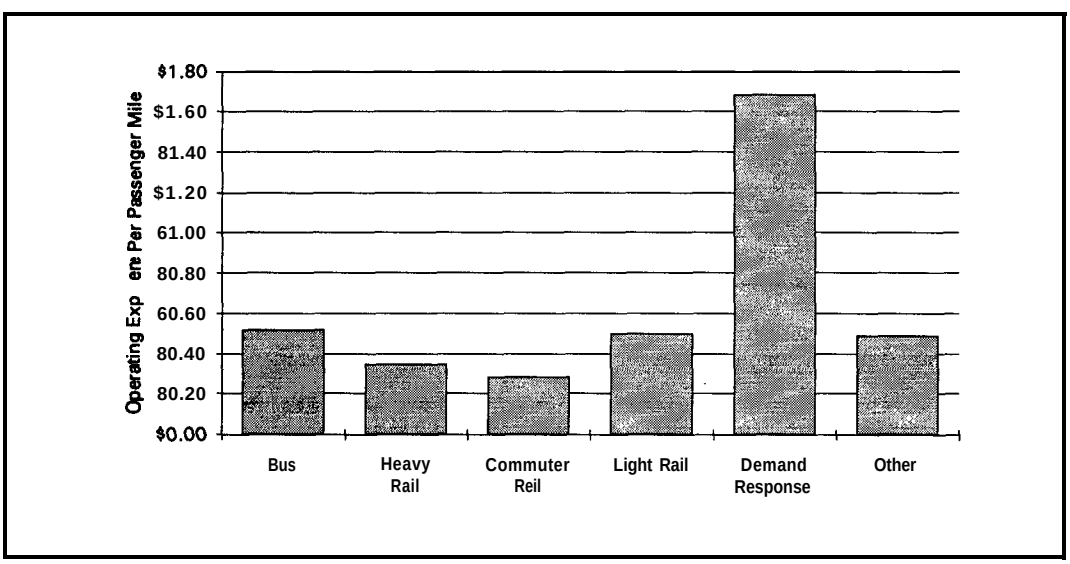
Mode	1990	1991	1992	1993	1994
Bus	$1.56	$1.65	$1.82	$1.84	$1.91
Heavy Rail	1.63	1.77	1.61	1.79	1.75
Commuter Rail	5.87	6.01	6.92	6.48	6.57
Light Rail	1.36	1.58	1.64	1.68	1.46
Demand Response	8.53	9.47	11.03	10.38	11.73

Operating Expense Per Passenger Mile by Mode

Another assessment of cost effectiveness is provided through a comparison of operating expense per passenger **mile** by mode **in Exhibit** 92. Commuter rail and heavy rail are the most cost effective modes when cost per passenger mile is examined. This is due to their greater vehicle capacity, higher ridership, and longer trips taken on these modes. Conversely, demand response has the highest cost per passenger mile due to its long trip length but low vehicle capacity

Exhibit 92

Operating Expense Per Passenger Mile by Mode 1994



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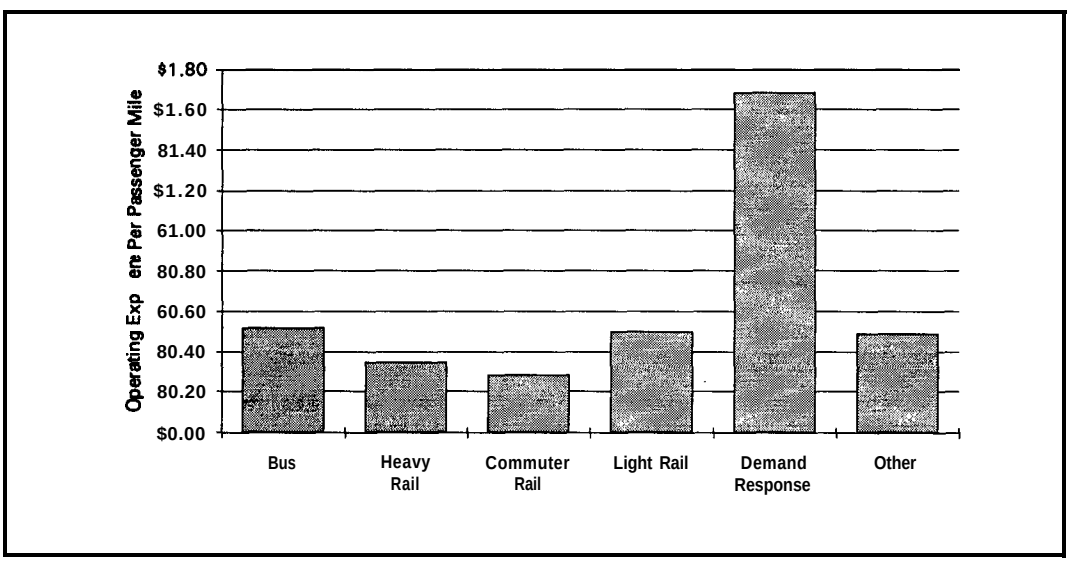


The change in unlinked passenger trips per vehicle revenue mile by mode from 1990 to 1994 is displayed **in Exhibit 95. All** modes experienced decreases during this period with the exception of light rail. Demand response shows the largest decrease with 13.8 percent. Bus, heavy rail, and commuter rail displayed decreases of **8.2, 6.8,** and 4.8 percent, respectively, for the 1990-l 994 timeframe. Light rail shows an increase in service effeo tiveness of 11.6 percent for that period.

Exhibit 95

Unlinked Passenger Trips Per Vehicle Revenue Mile by Mode 1990-1994

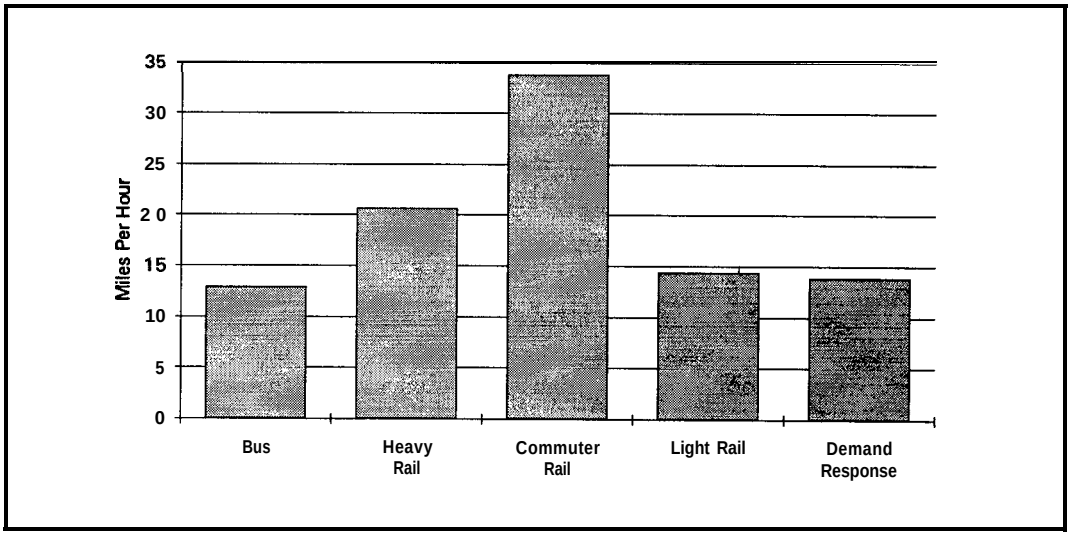
Mode	1990	1991	1992	1993	1994
Bus	3.18	3.11	3.05	2.94	2.92
Heavy Rail	4.51	4.26	4.33	4.05	4.20
Commuter Rail	1.70	1.64	1.57	1.58	1.62
Light Rail	7.60	6.90	6.74	6.96	8.48
Demand Response	0.23	0.23	0.22	0.21	0.20

Average Operating Speed

Average operating speed varies greatly among the modes. **As Exhibit 96** shows, bus, light rail, and demand response services operate at a much slower speed than heavy rail or commuter rail. Bus service operates in mixed **traffic** with **frequent** stops for boarding and alighting. Many light rail systems must also contend with mixed **traffic** while operating **at-**grade. The station/stop spacing of light rail also requires more frequent stopping for passenger boarding and alighting compared with the other rail modes. Demand response service also operates in mixed **traffic** and must deal with significantly longer boarding and alighting times for physically challenged patrons. Heavy rail and commuter rail operate along exclusive **fixed** guideways, with heavy rail stopping more **frequently** due to a shorter station spacing than commuter rail.

Exhibit 96

Average Operating Speed by Mode 1994



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Heavy Rail	4.51	4.26	4.33	4.05	4.20
Commuter Rail	1.70	1.64	1.57	1.58	1.62
Light Rail	7.60	6.90	6.74	6.96	8.48
Demand Response	0.23	0.23	0.22	0.21	0.20

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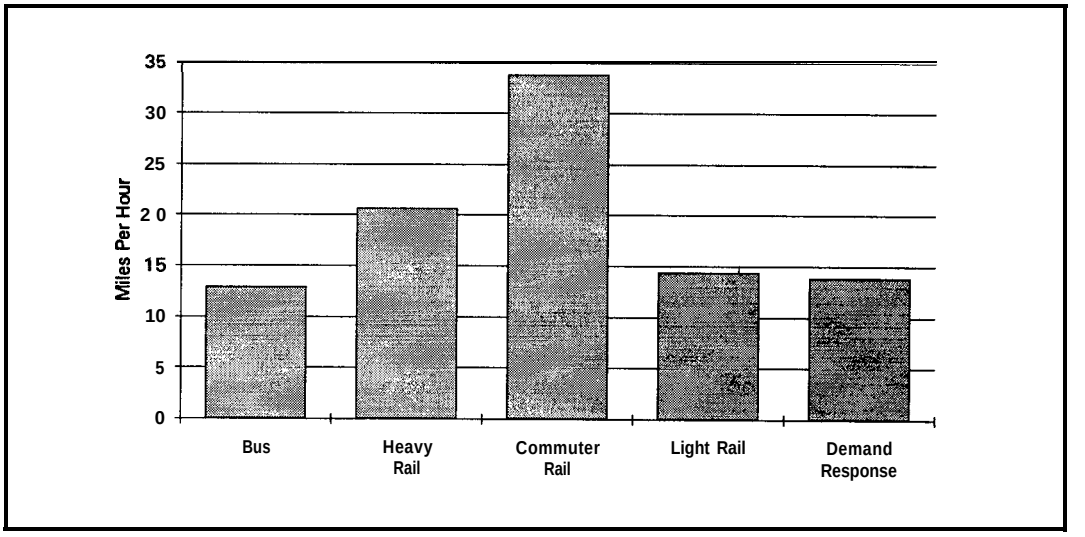

with 7.4 percent. Service within the mid-size urbanized areas is also dominated by bus, with 79.1 percent. Demand response service, however, accounts for a larger portion of service with a 18.4 percent share. The demand response share is the largest in small UZAs, where it provides 26.1 percent of all service operated.

Exhibit 98

Vehicle Revenue Miles by UZA Size and Mode
(Millions)
1994

UZA Size	Mode						Total
	Bus	Heavy Rail	Commuter Rail	Light Rail	Demand Response	Other	
Under 200,000	129.6	-		0.1	46.9	3.2	179.8
200,000 to 1 Million	297.1	-	0.5	1.0	69.2	7.6	375.5
Over 1 Million	1,159.1	516.0	209.1	32.2	156.7	51.2	2,124.3
Total	1,585.8	516.0	209.5	33.3	272.8	62.1	2,679.5

Vehicles Operated in Maximum Service by UZA Size and Mode

The number of vehicles operated in maximum service by UZA size and mode is displayed in **Exhibit** 99. The patterns evident in vehicle revenue miles are also provided with the number of vehicles. First, heavy rail, commuter rail, and light rail are operated almost exclusively in the largest UZAs. Combined, these modes account for 23.8 percent of the total vehicles operated during maximum service. Second, bus is the dominant mode in all UZAs, regardless of size. Finally, the share of demand response vehicles has an inverse relationship to urbanized area size. The greatest share of 40.2 percent occurs in the small UZAs, decreases to 25 percent in the medium areas, and, again, to 13.3 percent in the large areas.

Exhibit 99

Vehicles Operated in Maximum Service by UZA Size and Mode
(Millions)
1994

UZA Size	Mode						Total
	Bus	Heavy Rail	Commuter Rail	Light Rail	Demand Response	Other	
Under 200,000	3,536	-		4	2,534	232	6,308
200,000 to 1 Million	8,060	-	13	26	2,840	429	11,370
Over 1 Million	32,125	8,277	4,336	737	7,454	3,041	55,970
Total	43,723	8,277	4,349	769	12,828	3,702	73,648

Unlinked Passenger Trips by UZA Size and Mode

The unlinked passenger trips by UZA size and mode **can** be seen in **Exhibit 100.** It displays the change in transit ridership from 1990 to 1994 by UZA size and mode. Overall, there was a ridership growth in small and mid-size UZAs at 7.2 and 2.4 percent, respectively. For the 1990- 1994 timeframe, ridership for large UZAs decreased by 4.2 percent, but ridership in 1994 is 4.1 percent higher than in 1993. As shown in this exhibit, transit ridership is concentrated in the large UZAs. In total, nearly 88 percent of all transit trips occurred in these areas. The mid-size areas followed with nearly 9 percent, and the small areas accounted for only 3 percent of the total transit ridership during this period.

with 7.4 percent. Service within the mid-size urbanized areas is also dominated by bus, with 79.1 percent. Demand response service, however, accounts for a larger portion of service with a 18.4 percent share. The demand response share is the largest in small UZAs, where it provides 26.1 percent of all service operated.

Exhibit 98

Vehicle Revenue Miles by UZA Size and Mode
(Millions)
1994

UZA Size	Mode						Total
	BUS	Heavy Rail	Commuter Rail	Light Rail	Demand Response	Other	
Under 200,000	129.6	-		0.1	46.9	3.2	179.8
200,000 to 1 Million	297.1	-	0.5	1.0	69.2	7.8	375.5
Over 1 Million	1,159.1	516.0	209.1	32.2	156.7	51.2	2,124.3
Total	1,585.8	516.0	209.5	33.3	272.8	62.1	2,679.5

Vehicles Operated in Maximum Service by UZA Size and Mode

The number of vehicles operated in maximum service by UZA size and mode is displayed in **Exhibit** 99. The patterns evident in vehicle revenue miles are also provided with the number of vehicles. First, heavy rail, commuter rail, and light rail are operated almost exclusively in the largest UZAs. Combined, these modes account for 23.8 percent of the total vehicles operated during maximum service. Second, bus is the dominant mode in all UZAs, regardless of size. Finally, the share of demand response vehicles has an inverse relationship to urbanized area size. The greatest share of 40.2 percent occurs in the small UZAs, decreases to 25 percent in the medium areas, and, again, to 13.3 percent in the large areas.

Exhibit 99

Vehicles Operated in Maximum Service by UZA Size and Mode
(Millions)
1994

UZA Size	Mode						Total
	Bus	Heavy Rail	Commuter Rail	Light Rail	Demand Response	Other	
Under 200,000	3,530	-		4	2,534	232	6,308
200,000 to 1 Million	8,060	-	13	28	2,840	429	11,370
Over 1 Million	32,125	8,277	4,336	737	7,454	3,041	55,970
Total	43,723	8,277	4,349	769	12,828	3,702	73,648

Unlinked Passenger Trips by UZA Size and Mode

The unlinked passenger trips by UZA size and mode **can** be seen in **Exhibit 100.** It displays the change in transit ridership from 1990 to 1994 by UZA size and mode. Overall, there was a ridership growth in small and mid-size UZAs at 7.2 and 2.4 percent, respectively. For the 1990- 1994 timeframe, ridership for large UZAs decreased by 4.2 percent, but ridership in 1994 is 4.1 percent higher than in 1993. As shown in this exhibit, transit ridership is concentrated in the large UZAs. In total, nearly 88 percent of all transit trips occurred in these areas. The mid-size areas followed with nearly 9 percent, and the small areas accounted for only 3 percent of the total transit ridership during this period.

Exhibit 101

Passenger Miles by UZA Size and Mode
(Millions)
1990-1994

UZA Size	Year	Mode						Total
		Bus	Heavy Rail	Commuter Rail	Light Rail	Demand Response	Other	
Under 200,000	1990	748	-		0	47	7	802
	1991	780	-		0	53	13	846
	1992	815	-		0	63	10	888
	1993	810	-		0	77	27	914
	1994	843	-		0	77	33	953
200,000 to 1 Million	1990	2,535	-	-	20	74	29	2,658
	1991	2,553	-	0	20	73	38	2,684
	1992	2,552	-	5	19	91	46	2,713
	1993	2,540	-	6	19	104	52	2,721
	1994	2,593	-	6	19	96	65	2,779
Over 1 Million	1990	14,786	11,475	7,082	549	137	499	34,528
	1991	14,771	10,488	7,379	642	147	512	33,939
	1992	14,127	10,737	7,315	681	162	529	33,551
	1993	14,014	10,231	6,906	684	209	546	32,590
	1994	13,760	10,668	7,990	811	203	717	34,150
Total	1990	18,069	11,475	7,082	569	258	535	37,988
	1991	18,104	10,488	7,384	662	273	563	37,474
	1992	17,494	10,737	7,320	700	317	585	37,153
	1993	17,364	10,231	6,912	704	389	625	36,225
	1994	17,196	10,668	7,996	830	376	815	37,881

Passenger miles, like transit ridership, are concentrated in large UZAs. Given the interaction between these two measures, it is not surprising to find that, historically, approximately 90 percent of all passenger miles occurred in these larger UZAs. The remaining 10 percent was split between the mid-size UZAs, with 7.3 percent, and the small UZAs, with 2.5 percent. Examination of the modal data indicates that demand response is the only mode to show growth among all UZAs over the 5-year period, with 63.8 percent in small areas, 29.7 percent in mid-size UZAs, and 48.1 percent in large UZAs between 1990 and 1994. The other area of significant growth occurred in light rail passenger miles, which posted a 47.7 percent increase in large UZAs. Heavy rail experienced a decline in passenger miles for the 1990-1994 timeframe with 7 percent, but had an increase of 4.3 percent from 1993 to 1994. This increase is impressive, taking into account a reporting change by Boston that reported in 1994 as light rail some lines that were reported as heavy rail in the past. These lines have high ridership and passenger miles. Bus experienced growth in passenger miles for both small and mid-size UZAs with 12.7 and 2.3 percent, respectively, and a 6.9 percent decrease in large UZAs. Bus displayed a consistent trend of decline in ridership and passenger miles in large UZAs over the 1990-1994 timeframe. Commuter rail displayed an increase in passenger miles between 1990 and 1994, with 12.8 percent, and an increase of 15.6 percent from 1993 to 1994.

Exhibit 101

Passenger Miles by UZA Size and Mode
(Millions)
1990-1994

UZA Size	Year	Mode						Total
		Bus	Heavy Rail	Commuter Rail	Light Rail	Demand Response	Other	
Under 200,000	1990	740	-		0	47	7	802
	1991	780	-		0	53	13	846
	1992	815	-		0	63	10	888
	1993	810	-		0	77	27	914
	1994	843	-		0	77	33	953
200,000 to 1 Million	1990	2,535	-	-	20	74	29	2,658
	1991	2,553	-	0	20	73	38	2,684
	1992	2,552	-	5	19	91	46	2,713
	1993	2,540	-	6	19	104	52	2,721
	1994	2,593	-	6	19	96	65	2,779
Over 1 Million	1990	14,786	11,475	7,082	549	137	499	34,528
	1991	14,771	10,488	7,379	642	147	5, 2	33,939
	1992	14,127	10,737	7,315	681	162	529	33,551
	1993	14,014	10,231	6,906	684	209	546	32,590
	1994	13,760	10,668	7,990	811	203	717	34,150
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	1991	18,104	10,488	7,384	662	273	563	37,474
	1992	17,494	10,737	7,320	700	317	585	37,153
	1993	17,364	10,231	6,912	704	389	625	36,225
	1994	17,196	10,668	7,996	830	376	815	37,881

Passenger miles, like transit ridership, are concentrated in large UZAs. Given the interaction between these two measures, it is not surprising to find that, historically, approximately 90 percent of all passenger miles occurred in these larger UZAs. The remaining 10 percent was split between the mid-size UZAs, with 7.3 percent, and the small UZAs, with 2.5 percent. Examination of the modal data indicates that demand response is the only mode to show growth among all UZAs over the 5-year period, with 63.8 percent in small areas, 29.7 percent in mid-size UZAs, and 48.1 percent in large UZAs between 1990 and 1994. The other area of significant growth occurred in light rail passenger miles, which posted a 47.7 percent increase in large UZAs. Heavy rail experienced a decline in passenger miles for the 1990-1994 timeframe with 7 percent, but had an increase of 4.3 percent from 1993 to 1994. This increase is impressive, taking into account a reporting change by Boston that reported in 1994 as light rail some lines that were reported as heavy rail in the past. These lines have high ridership and passenger miles. Bus experienced growth in passenger miles for both small and mid-size UZAs with 12.7 and 2.3 percent, respectively, and a 6.9 percent decrease in large UZAs. Bus displayed a consistent trend of decline in ridership and passenger miles in large UZAs over the 1990-1994 timeframe. Commuter rail displayed an increase in passenger miles between 1990 and 1994, with 12.8 percent, and an increase of 15.6 percent from 1993 to 1994.

Operating Expense Per Passenger Mile by UZA Size and Mode

Operating expense per passenger mile by UZA area siie and mode is displayed **in Exhibit** 104. This measure of cost effectiveness displays some of the same trends as those found in the cost per trip ratios. Specifically, the cost per passenger mile for bus is lower in **mid-**size **UZAs,** with 9.7 percent, and slightly higher in large **UZAs,** at 1 percent, compared with the small **UZAs**. In addition, the cost of demand response service increases with urbanized area size: 17.9 percent higher for mid-size **UZAs** and 49.3 percent higher for large **UZAs** when compared with the cost in small areas. Light rail and commuter rail show the opposite pattern; their cost per mile decreases as the UZA size increases. Light rail costs decrease 24.2 percent when operations occur in mid-size **UZAs** as opposed to small **UZAs**. In large **UZAs,** cost decreases 5 1.3 percent. A decrease of 72.4 percent occurs for commuter rail when comparing the cost per passenger mile in mid-size **UZAs** with the cost in large areas.

Exhibit 104

Operating Expense Per Passenger Mile by UZA Size and Mode
1994

UZA Size	Mode				
	Bus	Heavy Rail	Commuter Rail	Light Rail	Demand Response
Under 200,000	**$0.53**	-		$1.00	**$1.28**
200,000 to 1 Million	**0.47**	-	$1.01	**0.76**	1.51
Over 1 Million	**0.52**	**$0.35**	**0.28**	0.49	1.92
Weighted Average	$0.52	$0.35	$0.28	$0.50	$1.68

Average Operating Speed by UZA Size and Mode

Average operating speed of each mode by UZA size **can** be seen in **Exhibit 105.** Bus service in large **UZAs** operates 8.6 and 9.4 percent slower than in mid-size and small **UZAs,** respectively. Demand response and light rail, however, show a **different** pattern. The average operating speed of demand response service in mid-size **UZAs** is 12.5 percent higher than for small **UZAs**. For large **UZAs,** the average operating speed for demand response is 3.4 percent higher than for small **UZAs**. The operating speed of light rail, however, increases dramatically with UZA size.

Exhibit 105

Average Operating Speed by UZA Size and Mode
1994

UZA Size	Mode				
	Bus	Heavy Rail	Commuter Rail	Light Rail	Demand Response
Under 200,000	13.89	-		4.53	13.24
200,000 to 1 Million	13.77	-	42.26	10.66	14.90
Over 1 Million	12.58	20.68	33.79	14.57	13.69
Weighted Average	12.89	20.68	33.80	14.39	13.89

Operating Expense Per Passenger Mile by UZA Size and Mode

Operating expense per passenger mile by UZA area siie and mode is displayed **in Exhibit** 104. This **measure** of cost effectiveness displays some of the same trends as those found in the cost per trip ratios. Specifically, the cost per passenger mile for bus is lower in **mid-**size **UZAs,** with 9.7 percent, and slightly higher in large **UZAs,** at 1 percent, compared with the small **UZAs**. In addition, the cost of demand response service increases with urbanized area size: 17.9 percent higher for mid-size **UZAs** and 49.3 percent higher for large **UZAs** when compared with the cost in small areas. Light rail and commuter rail show the opposite pattern; their cost per mile decreases as the UZA size increases. Light rail costs decrease 24.2 percent when operations occur in mid-size **UZAs** as opposed to small **UZAs**. In large **UZAs,** cost decreases 5 1.3 percent. A decrease of 72.4 percent occurs for commuter rail when comparing the cost per passenger mile in mid-size **UZAs** with the cost in large areas.

Exhibit 104

Operating Expense Per Passenger Mile by UZA Size and Mode
1994

UZA Size	Mode				
	Bus	Heavy Rail	Commuter Rail	Light Rail	Demand Response
Under 200,000	**$0.53**	-		$1.00	**$1.28**
200,000 to 1 Million	**0.47**	-	$1.01	**0.76**	1.51
Over 1 Million	**0.52**	**$0.35**	**0.28**	0.49	1.92
Weighted Average	$0.52	$0.35	$0.28	$0.50	$1.68

Average Operating Speed by UZA Size and Mode

Average operating speed of each mode by UZA size **can** be seen in **Exhibit 105.** Bus service in large **UZAs** operates 8.6 and 9.4 percent slower than in mid-size and small **UZAs,** respectively. Demand response and light rail, however, show a **different** pattern. The average operating speed of demand response service in mid-size **UZAs** is 12.5 percent higher than for small **UZAs**. For large **UZAs,** the average operating speed for demand response is 3.4 percent higher than for small **UZAs**. The operating speed of light rail, however, increases dramatically with UZA size.

Exhibit 105

Average Operating Speed by UZA Size and Mode
1994

UZA Size	Mode				
	Bus	Heavy Rail	Commuter Rail	Light Rail	Demand Response
Under 200,000	13.89	-		4.53	13.24
200,000 to 1 Million	13.77	-	42.26	10.66	14.90
Over 1 Million	12.58	20.68	33.79	14.57	13.69
Weighted Average	12.89	20.68	33.80	14.39	13.89

Total Reported Incidents By Mode

Exhibit 106 provides total reportable incidents by mode from 1990 to 1994. The total number of incidents reported decreased from 1990 to 1993. The number of incidents decreased nearly 29 percent from 1990 to 1993 and increased by approximately 7 percent from 1993 to 1994. One possible explanation for a greater number of incidents is the increase in service consumption observed in 1994 with the addition of new reporters and the expansion in the ridership of existing ones. At the modal level, every mode experienced a decrease in the number of incidents for the 1990- 1994 timeframe, with the exception of heavy rail, which increased 2 1.4 percent between 1990 and 1994. The greatest decrease was experienced by demand response, with a decrease of 46 percent for the 1990- 1994 timeframe. The number of incidents for bus decreased by nearly 33 percent. Incidents for commuter rail and light rail decreased by 11 and 12 percent, respectively, during the same period. Comparing the data for 1993 with that for 1994, commuter rail experienced the greatest increase in incidents with a 47.5 percent gain.

Exhibit 106

Total Reported Incidents by Mode
Directly Operated Service
1990-1994

Mode	1990	1991	1992	1993	1994
Bus	71,636	66,036	52,361	45,545	47,924
Heavy Rail	13,070	14,917	15,512	15,082	15,862
Commuter Rail	3,500	3,236	3,235	2,111	3,115
Light Rail	1,606	1,700	1,520	1,182	1,413
Demand Response	1,961	1,457	1,147	973	1,051
Total	**91,773**	**87,346**	**73,795**	**64,893**	**69,365**

Total Fatalities by Mode

A trend similar to incidents is depicted in **Exhibit 107** for the number of fatalities. The number of fatalities decreased from 1990 to 1993 and increased by nearly 18 percent from 1993 to 1994. At the modal level, commuter rail and light rail reported significant increases in the number of fatalities for the 1990- 1994 timeframe. For commuter rail, fatalities increased by 14.3 percent. The data for light rail displayed erratic behavior with ups and downs along the timeframe considered. As expected, the number of fatalities by

Exhibit 107

Total Fatalities by Mode
Directly Operated Service
1990-1994

Mode	1990	1991	1992	1993	1994
Bus	110	87	99	83	105
Heavy Rail	112	100	91	83	85
Commuter Rail	98	93	80	86	112
Light Rail	5	13	7	15	13
Demand Response	**0**	**3**	**0**	**2**	**2**
Total	**325**	**296**	**277**	**269**	**317**

Total Reported Incidents By Mode

Exhibit 106 provides total reportable incidents by mode from 1990 to 1994. The total number of incidents reported decreased from 1990 to 1993. The number of incidents decreased nearly 29 percent from 1990 to 1993 and increased by approximately 7 percent from 1993 to 1994. One possible explanation for a greater number of incidents is the increase in service consumption observed in 1994 with the addition of new reporters and the expansion in the ridership of existing ones. At the modal level, every mode experienced a decrease in the number of incidents for the 1990- 1994 timeframe, with the exception of heavy rail, which increased 2 1.4 percent between 1990 and 1994. The greatest decrease was experienced by demand response, with a decrease of 46 percent for the 1990- 1994 timeframe. The number of incidents for bus decreased by nearly 33 percent. Incidents for commuter rail and light rail decreased by 11 and 12 percent, respectively, during the same period. Comparing the data for 1993 with that for 1994, commuter rail experienced the greatest increase in incidents with a 47.5 percent gain.

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Directly Operated Service
1990-1994

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Total	**91,773**	**87,346**	**73,795**	**64,893**	**69,365**

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Total Fatalities by Mode
Directly Operated Service
1990-1994

Mode	1990	1991	1992	1993	1994
Bus	110	87	99	83	105
Heavy Rail	112	100	91	83	85
Commuter Rail	98	93	80	86	112
Light Rail	5	13	7	15	13
Demand Response	**0**	**3**	**0**	**2**	**2**
Total	**325**	**296**	**277**	**269**	**317**

Total Incidents Per 100 Million Passenger Miles by Mode

The number of incidents per 100 million passenger miles is indicated **in Exhibit 110.** Demand response displayed the greatest number of incidents per passenger mile, with 800.6 incidents per 100 million passenger miles. This figure is nearly 2.7 times greater than the second largest figure, which is 296 incidents per 100 million passenger miles for bus. Rail modes displayed a more favorable ratio because they are fixed guideway modes using exclusive rights-of-way with no interference from mixed traffic. An exception is light rail, which has some operators sharing the right-of-way with mixed traffic. In some degree, this explains light rail having the highest rate among the rail modes.

Exhibit 110

Total Incidents Per 100 Million Passenger Miles by Mode
Directly Operated Service
1990-1994

Mode	Incidents	Passenger Miles (Millions)	Incidents Per 100 Million Passenger Miles
Bus	47,924	16,195.50	295.9
Heavy Rail	15,862	10,668.03	148.7
Commuter Rail	3,115	7,366.33	42.3
Light Rail	1,413	831.04	170.0
Demand Response	1,051	131.28	800.6
Total	69,365	35,192.17	
Weighted Average			197.1

Total Incidents Per 100 Million Unlinked Passenger Trips by Mode

Incidents per 100 million unlinked passenger trips are presented in **Exhibit 111.** The relative safety of each of the five major modes is reflected in relation to the ridership that each mode realizes. Again, the rail modes show the lowest rates of incidents per 100 million unlinked passenger trips. Bus displayed a higher rate than rail, with 1,070 incidents per 100 million unlinked passenger trips, and demand response displayed a rate almost 6 times greater than bus.

Exhibit 111

Total Incidents Per 100 Million Unlinked Passenger Trips by Mode
Directly Operated Service
1994

Mode	Incidents	Unlinked Passenger Trips (Millions)	Incidents Per 100 Million Unlinked Passenger Trips
Bus	47,924	4,478.3	1,070.0
Heavy Rail	15,862	2,169.4	731 .o
Commuter Rail	3,115	317.8	980.0
Light Rail	1,413	282.2	501 .o
Demand Response	1,051	16.8	6,256.0
Total	69,365	7,264.5	
Weighted Average			954.7

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Fatalities Per 100 Million Passenger Miles

The very low fatality rates experienced by all modes when measured in terms of passenger miles is presented in **Exhibit 114.** Light rail displays the highest rate, with **1.6** fatalities per 100 million passenger miles. Commuter rail and demand response experienced an identical rate of 1.5. Bus and heavy rail show rates below the national average of .9 fatalities per 100 million passenger miles. The rate for bus is 22.2 percent smaller than the national average, while heavyrail is 11.1 percent smaller.

Exhibit 114

Total Fatalities Per 100 Million Passenger Miles by Mode
Directly Operated Service
1994

Mode	Fatalities	Passenger Miles (Millions)	Fatalities Per 100 Million Passenger Miles
Bus	105	16,195.5	0.7
Heavy Rail	85	10,668.0	0.8
Commuter Rail	112	7,336.3	1.5
Light Rail	13	831 .O	1.6
Demand Response	2	131.3	1.5
Total	317	35,162.1	
Weighted Average			0.9

Fatalities Per 100 Million Unlinked Passenger Trips

Exhibit 115 displayed the high incidence of fatalities per 100 million unlinked passenger trips for commuter rail, with a rate of 35.2 fatalities. Demand response shows a rate of 12 fatalities per 100 million unlinked passenger trips. The rates for heavy rail and light rail are 3.9 and 4.6, respectively. Heavy rail's rate is 9 percent smaller than the national average. Bus displayed the lowest rate, with only 2.3 fatalities per 100 million unlinked passenger trips.

Exhibit 115

Total Fatalities Per 100 Million Unlinked Passenger Trips by Mode
Directly Operated Service
1994

Mode	Fatalities	Unlinked Passenger Trips (Millions)	Fatalities Per 100 Million Unlinked Passenger Trips
Bus	105	4,478.2	2.3
Heavy Rail	85	2,169.4	3.9
Commuter Rail	112	317.8	35.2
Light Rail	13	282.2	4.6
Demand Response	2	16.8	12.0
Total	317	7 4.4	4.3
Weighted Average			

Fatalities Per 100 Million Passenger Miles

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Demand Response	2	16.8	12.0
Total	317	7 4.4	4.3
Weighted Average			

Collision and Non-Collision Incidents by Mode

The number of collision and non-collision incidents by mode is presented in Exhibit 118. Bus accounted for the greatest portion of collision incidents, with 92.3 percent. For non-collision incidents, bus accounted for 50.5 percent and heavy rail accounted for 39.2 percent.

Exhibit 118

Collision and Non-Collision Incidents by Mode
Directly Operated Service
1994

Mode	Collision Incidents	Non-Collision Incidents	Total
Bus	26,721	21,429	48,150
Heavy Rail	830	16,647	17,477
Commuter Rail	265	2,920	3,185
Light Rail	477	986	1,463
Demand Response	644	453	1,097
Total	28,937	42,435	71,372

Chapter 8
Reliability and Maintenance Effectiveness

Introduction

This chapter discusses measures of service quality, such as service reliability and the effectiveness of transit maintenance. While there are numerous measures of service quality in the transit industry, the data presented in this chapter are based on the information reported by the nation's transit agencies.

Chapter Organization

The chapter reviews service reliability in terms of the number of vehicle revenue miles between roadcalls and discusses maintenance effectiveness by examining maintenance expense per vehicle revenue mile of service for each mode.

General Notes

Before reviewing this chapter, some items should be noted. The appropriate definition of roadcalls and consistent reporting of roadcalls within the transit industry have not been fully resolved. Roadcalls discussed herein are roadcalls for mechanical failure, as defined in *the 1994 Reporting Manual*. Thus, revenue service interruptions caused by failure of some mechanical element of the revenue vehicle are considered. These interruptions include breakdowns of air equipment, brushes, fuel system, engine, steering and front axle, rear axle and suspension, torque convertors, electrical units, and heating and cooling systems. These revenue service interruptions are ones that prevent a vehicle from running and that require someone other than the vehicle operator or crew member to restore the vehicle to an operating condition. It should be noted that roadcalls are not a measure of the number of times that vehicles in revenue service are put out of service. There are many situations in which a vehicle in revenue service is put out of service for non-mechanical reasons, such as accidents. Accidents, as an example, are events not necessarily counted as roadcalls in the National Transit Database (NTD) because an accident may not be related to a mechanical failure of the vehicle.

The NTD reporting deals with maintenance data only for directly operated service. Purchased transportation expenses are not typically reported as individual maintenance functions, but are generally reported with total purchased transportation costs, which are reported as either vehicle operations or general administration expenses.

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